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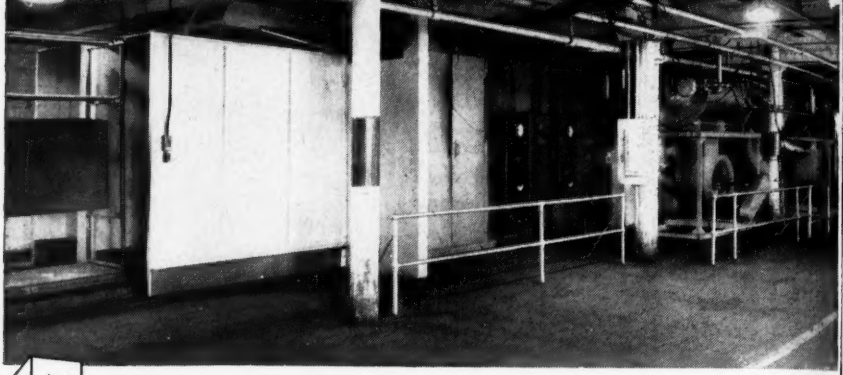

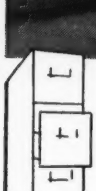

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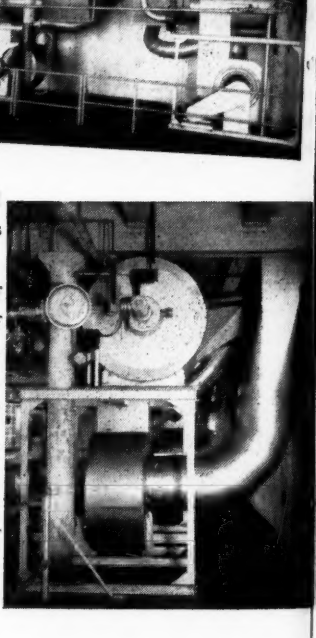

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Dividends From Controlled Plating

Control of plating processes by regular analysis of baths has greatly increased in recent years, not only in large production units, but also in smaller plants. In general, it is unwise to attempt to meet specifications for thickness and quality of coatings without checking the bath composition at frequent intervals on regular production schedules. Plating baths, being an integral part of many manufacturing operations involving metal products, require constant attention. Electrodeposits meeting today's requirements for nigh quality keep the responsibility of proper methods for the control of solutions among the foremost facing the production man in the plating department.

Every well-controlled plating bath is operated within specified limits. The concentration of chemicals is kept within limits. The anode and cathode current densities are kept within limits and impurities entering the bath are kept below undesirable concentrations. The temperature and even the rate of cathode movement may be controlled.

One advantage of regular determination of major constituents and their maintenance within predetermined limits is that subsequent failure to yield good deposits is then probably attributable to variations in minor constituents, either intentionally introduced materials, such as addition agents, or accidental impurities. A test of satisfactory plating range may indicate whether more of a particular addition agent is required. Much activity is being shown in the development of rapid colorimetric methods to determine whether the content of a given foreign metal is approaching its permissible limit.

Volumetric methods that are rapid, reliable, and simple enough to be applied by persons with only elementary chemical training are now available for most of the determinations required for the control of plating processes. However, the usefulness of such measurements may depend upon the ability to correlate the performance of the baths with the analytical results. This is true because the purpose of analytical control of plating baths is not to determine their composition, but to predict whether they will operate satisfactorily, or to determine the changes necessary to ensure proper performance.

As a finish for decorative or functional improvement of product, flock offers a wealth of possibilities. Materials and coating methods are reviewed in this factual digest.

By ARTHUR P. SCHULZE

PF FEATURE

Flocking was once widely regarded simply as a novelty, but that view has undergone a drastic change among product finishers in recent years. As a matter of fact, flock coating is rapidly coming of age as a standard finishing process.

Durability, economy, ease of application, and adaptability to meet a wide range of requirements—all essential characteristics of a quality finish—are the chief factors which account for this relatively rapid transition. Today, as a consequence, articles finished for greater beauty or utility in this comparatively new way run into the hundreds, and the list continues to grow. This is a result of the development and improvement of the materials and methods used.

With flock as a finish swiftly establishing a place for itself under the industrial sun and thus getting more and more attention these days, a discussion of flocking summarizing its principal applications and advantages should prove of timely interest and value for many finishing department superintendents and shop foremen.

Types of Flock Most Widely Used

Flock can be described best, perhaps, as "custom-made fuzz or lint,"

which is exactly what this material so closely resembles in bulk. Actually, it comprises millions of short, fine strands or filaments cut from carefully selected and specially processed textile fibers, usually cotton, rayon, or wool.

Cut in closely controlled lengths, the lint-like strands are dyed under exacting, rigid laboratory control in a variety of colors ranging from white and wine through yellow, green and ecru to brown and blue. Rich looking, bright and beautiful, they offer a latitude of selection to product designers, development engineers and finishing executives that encompasses the widest range of current industrial choice.

Most common lengths of flock are $\frac{1}{16}$ inch and $\frac{1}{8}$ inch and 1 mm. which, according to one leading flock manufacturer's experience, account for approximately 80 per cent of production. This particular producer explains that his plant cuts flock from 0.015 to 0.090 inch in graduations of 0.005 inch. The longest practical length in commercial use is 0.090 inch.

Type of flock and length of fibers to be used in any instance depend upon the purpose of surface coating and the particular finish effect desired. For example, where a coating possessing the characteristics of suede and the allure of leather is wanted, the types generally used are cotton and dull or fine rayon. The finish produced by these materials proves especially successful in those applications where a mar-proof surface and a decorative effect with an attractive touch appeal are sought.

For the rich beauty of plush, velvet and velour, the preference is rayon. Figures 1, 2, and 3 show metal objects coated with rayon flock. More easily adapted to different applications since it dyes to a deeper color richness and produces greater pile depth than does cotton, rayon offers the additional advantage of providing effective sound-absorbing properties. Such qualities are of key importance in certain specialized applications. Coating aircraft interiors is one typical illustration. In this particular instance the triple effects of decoration, insulation and sound-proofing are all achieved in one application of flock.

Continuous filaments are preferred for the manufacture of quality flock due to the ease with which they may be processed, the greater uniformity and closer control of diameter and flock length secured, and the deeper color richness obtained. Rayon is

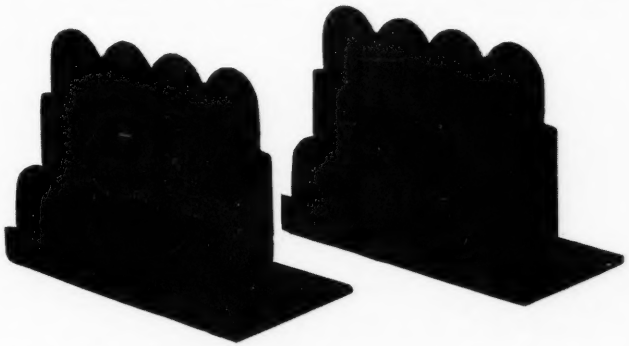

Fig. 1—"Behrlonized" metal book ends. Flock: Behrlon Tufkote; adhesive: synthetic varnish; application method: spray gun. *(Photo courtesy Behr-Manning Corp., Troy, N. Y.)*

available to flock manufacturers in the form of continuous filament tow in which all of the fibers are of uniform diameter and essentially parallel. This permits a precision cut and accuracy of flock diameter and length not obtainable with staple fibers, such as cotton and wool. Flock cut from

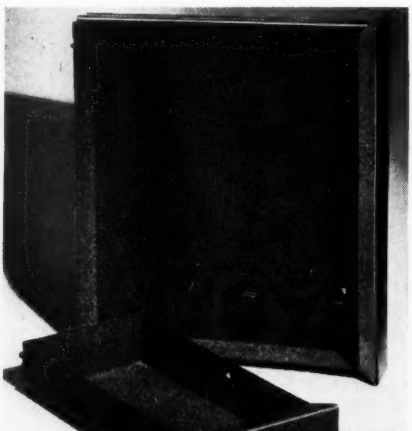

Fig. 2—Pictured here is a "Behrlonized" metal safety deposit box—merely one of myriad items fabricated from metal and other materials that can be given an attractive finish at relatively low cost through the application of flock.
(Photo courtesy Behr-Manning Corp., Troy, N. Y.)

tow remains essentially straight and free from "kinks" and "curls" prevailing in natural fiber flock, especially of the longer lengths.

Wool produces a soft dull finish. Presently, its most effective use (in black) is reported to be that of coating camera interiors, where a deep black non-reflecting surface is indispensable from the functional standpoint. (Cotton flock is also used for this purpose.) Wool, in addition, may be employed to give a rough felt, mohair or fibrous surface finish. Flock made from silk and many types of animal hair also is available for product finishing purposes.

Adhesives

It should be recognized and emphasized that the finest flock finish created by even the most skilled finisher can become downright mangy if it fails to "stay put" for the life of the product surface so garbed. Correct application of the proper adhesive to the surface to be coated constitutes an initial step of prime significance in flock finishing. The fact that coating durability depends so much upon adhesive quality cannot be underscored too heavily. Several different types of adhesives are available, of course, and each has its proper place. Selection of any one kind against another for a specific application is determined by the requirements of the particular job.

Adhesives in common use today for flock coating include water-soluble glues, varnishes, enamels (natural or synthetic), lacquers and specialized rubber-base compositions. Economical and transparent, water-soluble glue may be used on virtually any surface —metal, paper, or wood—providing the surface remains sufficiently wet to permit flock application without adversely affecting the product. However, due to its solubility in water, this material is not suggested as a flock adhesive on such items as kitchen cabinet tableware drawers.

Natural and synthetic enamels are quite popular flock adhesives since they are opaque, water repellent and available in all colors. Moreover, their solvent content evaporates slowly. This feature is especially desirable, for by leaving the surface wet for a longer period, more time is thus provided for flock application. Hence, the film is still wet, not merely tacky, when the flock fibers come in contact with it.

Flock coatings of a highly special-

ized character call for alkyd resin enamels as a general rule. Alkyd resin, extremely water resistant and providing a very tough film, is suited for application to articles which must be waterproof and wear resistant. The solvents in this type adhesive, as with enamel adhesives, evaporate at a slow rate, thus making this material particularly adaptable to production line flocking requirements.

quite strong to get a different color shade in the flock coating. A masking technique also has been successfully utilized for this purpose on certain applications, such as finishing airplane interiors.

Generally speaking, based on both plant production practice and custom shop experience, it is the synthetic varnishes, enamels, resins and rubbers which prove the most adaptable ad-

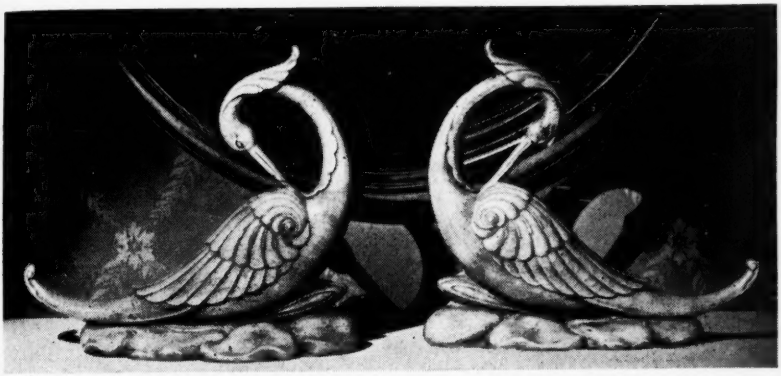

Fig. 3—This set of table decorations was flock coated on the bottom to provide a mar-proof finish. (*Photo courtesy Cellusuede Products, Inc., Rockford, Ill.*)

Specially formulated lacquers, either clear or in colors, also serve as excellent flock adhesives, proving suitable for use with both opaque or translucent finishes. Their solvents evaporate more quickly than those incorporated in natural or synthetic enamels, thereby demanding greater speed in subsequent flock coating. As mentioned earlier, fibers must strike the adhesive-covered surface while it is still wet if satisfactory finishing results are to be obtained.

Flock adhesives in synthetic resin, nitrocellulose and elastomer formulations are available in a broad range of colors to accentuate the brightness of colored flock or to produce distinctive and novel two-tone effects with a color contrast that provides striking interest. This color difference must be

hesives for the widest variety of flock finishing applications. Industrial usage currently favors varnishes and enamels for coating metal, wood and other non-flexible surfaces; resins and rubber adhesives are usually preferred for paper, cloth and similar flexible materials.

This growing utilization of synthetic adhesives, particularly the resins—alkyd, urea, vinyl, phenol, resorcinol—stems from the remarkable technological progress made during wartime in their development and application. As a result, several prominent paint producers and chemical suppliers now market flock adhesives designed to meet industry's most specialized and exacting flock coating application requirements. Notable examples among these adhesives include special enam-

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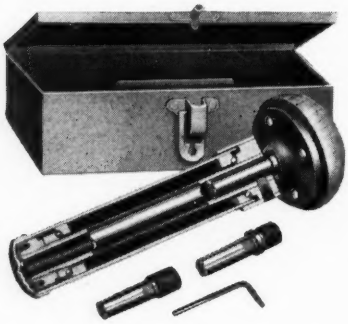

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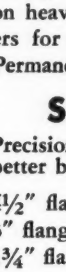

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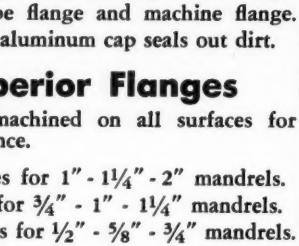

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els, which set up on air drying; and synthetic rubber-base adhesives, resistant to both wet and dry cleaning, which must be cured to obtain proper setting.

Regardless of the type of adhesive used, "stickiness"—high elasticity and excellent tensile strength—is considered its most vital single requisite. Also, it must have the ability of spreading uniformly in a very light surface film. Still other important properties required of a good flocking adhesive include: quick drying with firm, pliable, permanent anchorage for each fiber throughout expected life usage of product; sufficient flexibility to resist cracking and peeling; good resistance to chafing, scuffing and abrasion; resistance to light and aging. In addition, the adhesive should be non-toxic, odorless and tasteless.

Methods of Applying Adhesive

Adhesives may be applied by various methods, each depending upon the nature, design, size, or shape of the product to be coated. These routines and their respective characteristic highlights are capsulized below.

1. Spray Gun. Spraying with regular paint spray equipment is widely practiced for coating three-dimensional objects or flat surfaces of small parts turned out on a mass production basis. The conventional spray gun is also well suited for large scale production on surfaces which are rigid or stationary and cannot be moved, such as large panels and walls. Complete spraying outfits are available commercially in size setups to accommodate individual plant or shop volume requirements.

In spraying flock adhesives, use of a pressure feed tank is generally recommended in order to regulate air pressure needed to force the adhesive to the spray gun. Either a single or double wet coat may be applied, depending on the thickness of the re-

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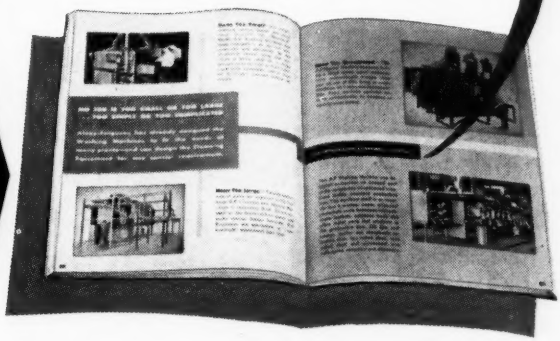

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quired adhesive film. Special rubber adhesives may necessitate additional equipment in some cases to keep the adhesive hot, and greater air pressure may be required in such instances to spray these hot materials.

2. Roller Coating. On large runs of flat surfaces, such as panels or sheet stock, the adhesive is either transferred from the surface of standard roller equipment to the material to be coated, or applied directly by a "doctor-blade". Thickness and uniformity of adhesive are accurately controlled by roller coating or knifing. Roller coating also may be used to advantage for mass production on flexible material that may be rolled or transported, such as fabric or paper.

3. Silk Screen Process. This method is especially adapted to pattern work and simulation of applique as in the manufacture of greeting cards, book covers, advertising cards, and displays.

4. Dip Coating. This method is suitable for coating products or par whenever their size and shape perm and their entire surface is to be tre ed. Toys are a good example. Care essential not only to assure comple draining of the dip coated adhesiv but also to prevent too rapid solve evaporation during draining.

5. Hand Brushing. This is a sati factory procedure for small items, wherever quantity production is im practical or undesirable.

While the first step in flock finis ing consists of applying the adhesiv certain materials require prelimina surface preparation. Porous item must be suitably sealed and metal su faces thoroughly cleaned to ensur satisfactory adhesion. Ferrous par may be adhesive treated directly o the base metal, while non-ferrous met als (aluminum, magnesium, and thei alloys) are generally sprayed wit zinc chromate before fiber coating.

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finishers underlines the importance of certain operational points governing effective adhesive application which have been brought out previously. For example, J. Donald Bostrom, president of Screen-Flock Industries, Chicago, advises: "Use the right adhesive and the correct flock (both in length and denier), and you have a durable, useful FINISH, not a novelty!"

Uniform film thickness comprises a factor of paramount importance in applying flock adhesives, says Diedrich Mundt, chemical engineer of Russell Electric Company, also of Chicago. In this plant, which flock coats record-player turntables in volume, many tests have been made indicating that the adhesive must be applied to a thickness of from 0.003 to 0.005 inch. Too thick a film results in runs and bubbles; a coating too thin causes poorly adhering flock piles.

Use of pigmented adhesives, add several flock manufacturers, provides a decidedly effective aid to operators in obtaining and controlling film thickness and uniformity. And this practice, it is further pointed out, likewise contributes to the appearance of greater density of coating.

Flock Coating Techniques

Application techniques for flock coating are varied, and each procedure is better adapted to some uses than others. Of these various procedures, the two most popular ones for applying flock fibers to the wet adhesive involve the use of a spray gun or beater bar.

Surface coating with flock by the spray technique is performed with special guns, designed and engineered expressly for this specific type of product finishing operation. Light in weight and simple in design for optimum operational ease, they range in size from smaller units, which spray the fibers from a small cup, to production models fed from large pressure material tanks. Figure 4 shows a cup gun for spraying flock.

The smaller guns, developed for applying flock where volume does not economically justify use of a flock pressure tank installation, are equipped

Fig. 4—The steel advertising display board shown here was flock finished in the following manner: adhesive (Spar varnish with black pigment added) was applied at 5 lb. material pressure and 45 lb. atomizing pressure; flock is $\frac{1}{16}$ inch black rayon applied at 20 lb. pressure using a Binks 171 flock gun with two-quart cup.
(Photo courtesy Binks Manufacturing Co., Chicago 12, Ill.)

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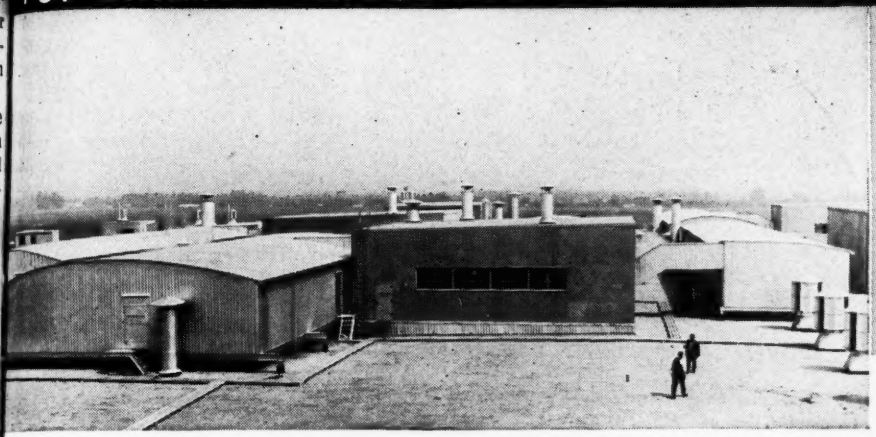

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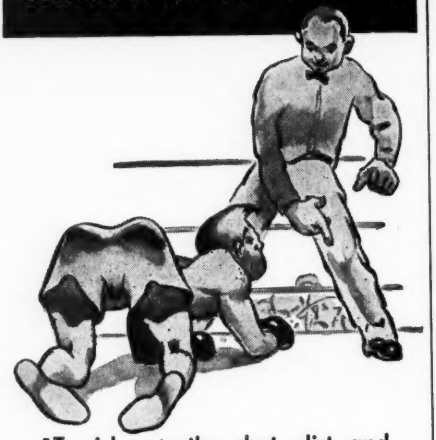

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with three adjusting valves: the first for controlling spray pattern from round to flat; the second to adjust the air going into the cup, agitating the flock and carrying the correct amount to the nozzle; the third to adjust the flow of flock out of the gun orifice.

Larger units designed for production-scale flock application and used with production tanks, are equipped with an air valve that operates the air control on the tank, which starts the flow and agitation of the material. Adjustment also is provided that regulates shape of spray. Leading spray gun makers also produce special booths which further simplify the work and eliminate unnecessary waste of flock. When flock is sprayed in a booth, adequate provision should be made to collect and retain oversprayed material for reuse.

The spray technique is most efficient and economical for three-dimensional work and volume production on flat surfaces that are rigid and in place. It is also used in lining furniture drawers and containers, and coating aircraft interiors. Flock is generally sprayed at 20 to 40 pounds pressure. Compressed air should be filtered to prevent dirt and moisture from reaching the flock.

Development and use of the beater bar method of coating surfaces with flock indicates that it is particularly well suited to coverage of flat surfaces that are flexible or of small dimensions to permit rapid vibration, for design work in conjunction with silk screening, and where limited production demands an economical means of application. For flocking fabrics and paper, composite equipment consisting of adhesive coater, multiple beater bars, and drying oven which forms a completely integrated unit has been developed.

Actually, three variations of the beater bar method are in wide com-

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mercial practice. Each capitalizes on the beating effect of a horizontally mounted flat-sided bar (square, hexagonal, or octagonal in shape) rotating against the underside of the sheet to be coated, and in that way causing the fibers to arrange themselves densely and uniformly. Flock may be dumped in steady but not too heavy amounts onto the wet adhesive covered surface which is then passed over the beater bar, or it may be blown on

screwed to a "two-by-six" or other suitable piece of lumber. While this beater bar may sound like nothing more than an elongated motor shaft resting on two pedestals, the method has proved to be practical for handling large, flat-surface jobs. That is because there is at least three feet of working space between the bearings. This unit, like spray equipment, is used in a booth.

After the article is covered with an

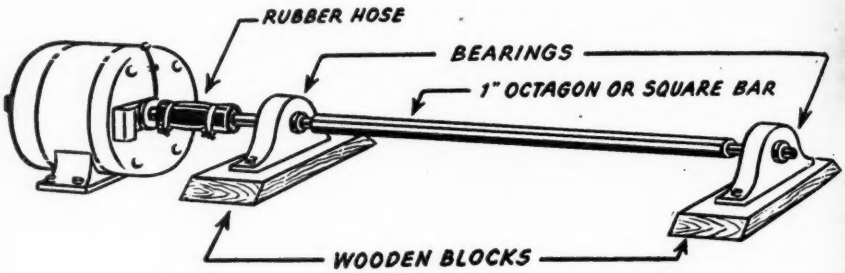

Fig. 5—A simple, economical, effective set-up for flock coating by beater bar method is shown here.
(Drawing courtesy Cellusuede Products, Inc., Rockford, Ill.)

or dropped from a vibrating screen after which it passes over the beater bar. Excess fibers not adhering to the surface drop off and are reused.

One typical beater bar setup (see Fig. 5) comprises an electric motor, a 1-inch octagonal bar from 3½ to 4 ft. long, two bearings and two bearing pedestals. One end of the bar is connected directly to the motor shaft, using a simple coupling made of rubber hose (1-inch i. d.), which is securely fastened with standard hose clamps to the motor shaft and the beater bar.

The bar is bearing-mounted to eliminate friction as well as to supply stability. One bearing is at the "free" end, and the other is about four to six inches from the coupling. The entire unit is lined up to prevent wobble; motor and bearing pedestals are

adhesive and a large quantity of flock placed on the wet surface, the bottom of the object is placed directly on the rotating octagonal beater bar described. For complete coverage, the object is swayed by the operator, who allows it to be continuously agitated by the bar, making it "bounce" up and down (or "dance," as flock finishers often term this action), causing the fibers to stand upright in the adhesive.

Several different types of power operated vibrator or beater machines based on the same application fundamentals outlined above have been developed for spreading flock fibers. Some units have a taut cloth screen, while others have an endless cloth belt. Also available for flocking operations are automatic coating machines, which employ the air coating principle and force out the flock through heated

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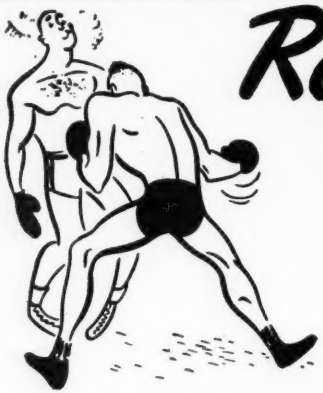
ducts. Coating thickness is accurately regulated with such units, enabling precision-made products to be air coated to close tolerances.

A third method of flock application is electrostatic coating, which requires special type equipment in which the fibers are activated by high voltage electricity. While this process produces a very dense and high quality coating, experimental work conducted by flock manufacturers indicates that electrostatic coating is practical only in a limited field at present. However, it is adaptable for large production on metal, fabric, paper and other surfaces where quality coating is the prime requisite and the cost factor is a secondary consideration.

Of all flock finishing installations, the largest and most elaborate is the electrostatic setup, which utilizes either a pulsating or interrupted direct potential, or an alternating potential. In the latter method repeated reversing of the sign of the charge on the electrodes and on the fibers causes the particles to bounce back and forth between the electrodes. Excellent orientation and vertical positioning of fibers and their extremely firm anchorage in the adhesive are significant characteristics of electrostatic flock coating. Greater beauty, richer color and substantially longer wearing qualities may thus be expected.

Following flocking, the coated surface is dried to set the adhesive and firmly secure the flock. This operation generally takes from 8 to 12 hours in the case of air drying. If an enamel or alkyd resin adhesive has been used, surfaces can be force dried in from 6 to 60 minutes, depending on the adhesive used. For lacquer adhesives, air drying generally takes about 15 minutes.

Satisfactory flock finishing calls for considerable care in handling fibers. Flock must be dry at all times; expos-



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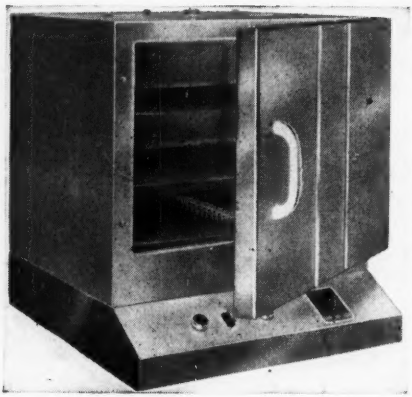

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ure to moisture or dampness must be avoided, both in storage and use, to prevent fibers from clinging together and becoming lumpy.

Two methods are used to dry flock fibers: infra-red drying, and calcium chloride drying. The first provides for mounting from four to six infra-red lamps over a long, smooth table on which flock is spread. A slower method of drying, but a better way to store flock in damp climates, involves the use of calcium chloride. With this method, a storeroom is equipped with racks or shelving containing this moisture absorbing material. The flock supply is placed in the room and kept there until needed. The flock is spread out to promote faster drying.

While flock must be maintained in dry condition for efficient application, it should not be made "bone" dry as this increases the static problem. It is generally considered that the natural moisture regain of the fiber that would be experienced under standard atmospheric conditions is the best for its application. Since some flock manufacturers add to the flock freeness-promoting finishes which may be more or less hydroscopic, these conditions may vary with flock of different manufacture.

In conclusion it may be said that so numerous are the possibilities of flock finishing that a steadily growing number of manufacturers turning out products of all sorts are currently investigating its use. Many present users are exploring additional ways to utilize it for effecting decorative or functional product improvement. There is little question that the art of flock coating has reached a high stage of development, marked by a wide scope of application and unusual versatility in use, and that continued refinement in technique can be expected. The following examples are generally representative of flock-coating's major uses today: (1) finishing the bottom of

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items to prevent wear on other surfaces (index files, letter trays, statuettes, ash trays, pipe holders, cigarette and jewelry boxes, book ends, lamp bases); (2) providing colorful and luxurious linings for drawers and trays in dining room furniture, cedar chests, bedroom chests, jewelry compartments of dressing tables, silverware chests, doll cabs, baby cabs, instrument cases, tool chests, cases for athletic equipment, interiors of automobile glove and trunk compartments; (3) increasing acoustical value by covering inside of musical instruments, radio cabinets, automatic player devices by coating thin metal sheets to absorb hum and other sound interference: (4) decorative styling for automobile and aircraft interiors; (5) affording protection and pleasant touch appeal to mirror backs, album covers, book covers, picture frames; (6) producing imitation suede shoes, belts, jackets and raincoats; (7) applying colorful applique patterns to textile materials; (8) increasing cushioning and "holding" ability of phonograph and automatic record-player turntables and telephone bases; (9) creating a new finish for toy animals and cloth dolls, a new effect in children's games and books, distinctively decorative coverings for lamp shades, jewel cases, gift boxes, greeting cards, desk and advertising portfolios.

AUTHOR'S ACKNOWLEDGMENT

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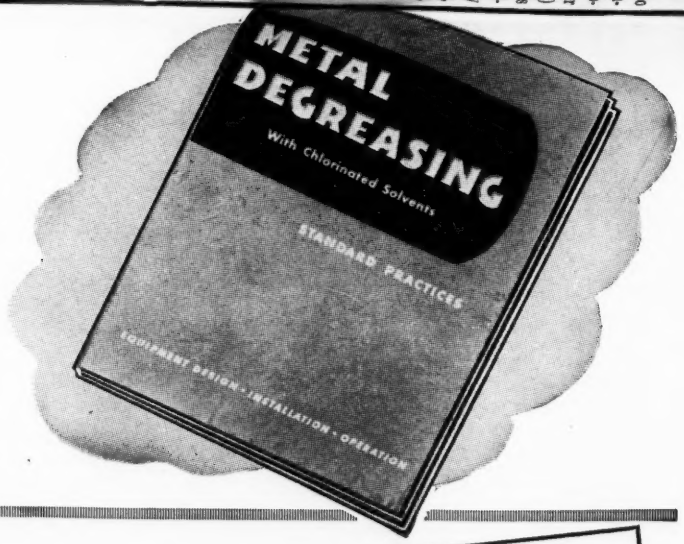

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Behind the story of destruction lies a tale of carelessness and neglect. It is a story of how fires could have been prevented had someone taken proper steps. It is a story of how fires got out of control because fire extinguishers were not available.

Few people realize the extent of fire damage because fires are a daily occurrence. Except for occasional headliners like the Texas City disaster or the Maine forest fires, the numerous fires that flare up all over the nation cause little concern.

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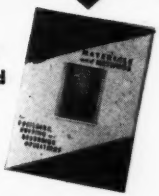

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paper it is not too hard to take. But for an idea of how terrible a fire can be, ask the man who has had one.

This article won't tell you that your finishing plant is going to burn down to the ground tomorrow. But it will remind you: unless you do take steps to prevent fires in **your** plant, it **may** burn to the ground.

For a number of years, a large manufacturing plant in Yonkers, New York was plagued by fires. Early in 1945 an enterprising factory superintendent convinced his bosses that the company needed a fire brigade. His call for volunteers was enthusiastically received by company employees. Two hundred men were soon learning how to fight and prevent fires. Along with teaching them to combat blazes, he made inspection crews out of them. Every Monday morning finds these men making their rounds in assigned areas of the plant, ferreting out fire hazards. Employees who are not on the fire brigades are given fire-safety education through the company publication. Today, fire losses in this plant have been cut substantially.

In Sprinfigeld, Ohio, fire-fighting has been turned into a sport. Each year fire brigades from several companies meet to match their skill in putting out fires. Events include the proper use of approved fire extinguishers, coupling fires hoses against time, combating fires against time, and similar events. Not only is this training men to fight fires, but it is also playing a big part in company-employee relations.

You can take similar steps to guard against fire. The short time that it will take to organize men to contend with fire hazards and to teach them to fight fires may pay big dividends some day.

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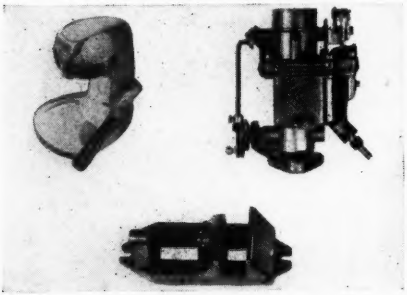

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more fires than other causes. Work out plans that will assure inspection of these common hazards regularly. Keep your plant free from dirt and rubbish. Oily rags combined with proper temperature will ignite spontaneously—get rid of them.

Unusual processes that you use to finish your product may produce special fire hazards. If your employees know about the fire hazards in your plant's special processes, the risk of fire will be lessened.

Along with organizing to prevent fires, organize to fight fires. With the help of your local fire department you can, in a short time, train a group of men to fight and control fires speedily.

Planning fire control is important. Place approved fire extinguishers where they will do the most good. In sections of your plant where wood, rubbish and similar fires are likely to occur, install fire extinguishers filled with soda and acid, or foam. Where gasoline, oil, or grease fires are most likely to flare up, place fire extinguishers loaded with vaporizing liquid, carbon dioxide or foam. Around electrical generators or wherever an electrical fire is most likely to occur, use fire extinguishers containing non-conductive agents. Fire extinguishers containing vaporizing liquid or carbon dioxide will put out electrical fires without danger of electrocution. You can install fire extinguishers of various capacities capable of handling most fires that may break out. The Fire Protection Institute recommends the use of fire extinguishers bearing the seal of the Underwriters' Laboratories.

If you are trying to make up your mind whether fire prevention and fire protection are necessary in your finishing plant, consider this: every year 43 per cent of severely fire-damaged firms don't resume operations, and another 28 per cent quit business within three years. Don't be a fall-guy for a flame. Be prepared for fire.

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Vapor Blast for SATIN FINISH

Blasting operation results in pleasing contrast between dull and bright areas on Chevrolet radio grille zinc alloy die casting

By HERBERT CHASE

TO attain an unusual and attractive finish that affords a contrast between bright and satin tones, Chevrolet radio grilles are given a vapor blast treatment in a special machine at the plant of the Brown-Lipe-Chapin Division, General Motors Corp., Syracuse, N.Y. The grilles are die cast in zinc alloy and, after buffing, exposed surfaces receive the usual bright copper and bright nickel plating.

Before applying the final chromium plate, however, the castings are placed on fixtures that carry them around a closed horizontal track of a special machine, illustrated in Fig. 1, in which the vapor blast units are incorporated. Figure 1 also shows a part of the track and the station at which castings are loaded and unloaded.

Blasting is done under a series of six nozzles, five of which can be seen in vertical position above the work in Fig. 2, which shows part of the machine, with a door removed, from the side opposite to that shown in Fig. 1. While in the machine, the work travels continuously and there is a continuous blast from all six nozzles. Rubber guards cover the top and bottom portions of the casting so that they are not struck by the blast. Only a band through the center receives the blast and the resultant satin-like sheen.

Blasting nozzles are made of a hard silicon iron that is resistant to abrasion. The blast of air at 70 pounds per sq. in. pressure passes through central tubes into the nozzles that have an elliptical shape at their ends. Water mixed with a very fine abrasive called "2500 Micromist" is fed by gravity through an annulus between the air tube and the wall of each nozzle, from an overhead tank.

After striking the work, the mixture, which contains 30 lb. of the fine grit to 30 gal. of water, drains into a sump and is pumped back to the top

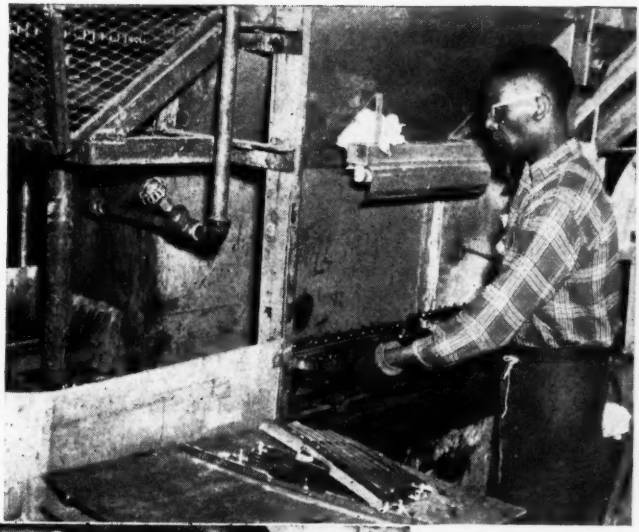
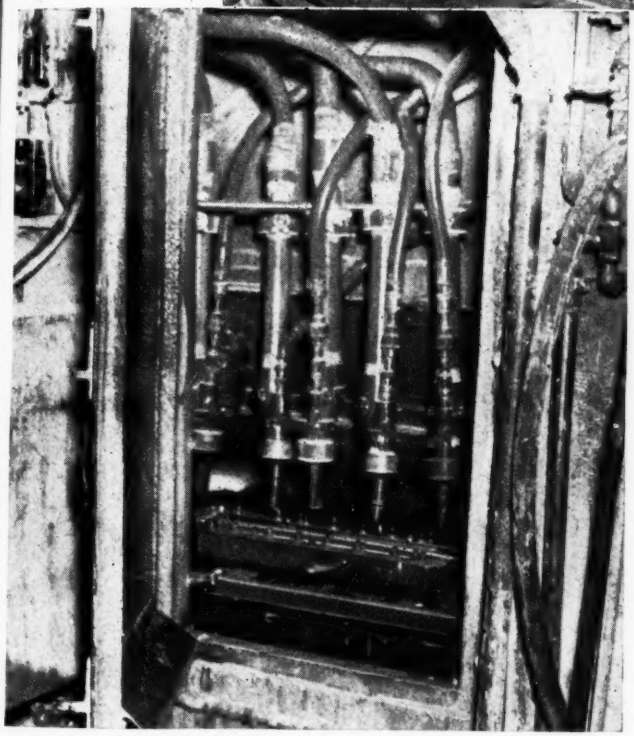


Fig. 1 — Illustration shows operator loading a nickel plated die cast radio grille on a fixture that is carried by a chain around a closed horizontal track and under a series of vapor blast nozzles.

tank for recirculation. About 1400 castings are fed through the machine in an eight-hour shift.

Upon completion of the cycle, the castings are returned to the plating line and



are put through the same final chrome plating that other castings receive. Bright areas remain bright after chrome plating but the blasted area, though receiving the same plate, retains the satin-like finish that the vapor blasting imparts. The completely finished radio

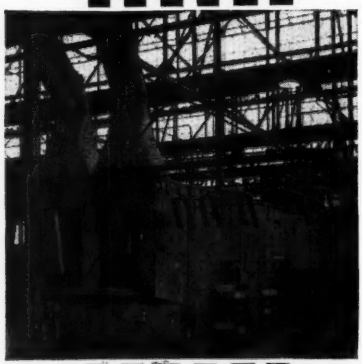
Fig. 2—A view of the blasting machine with the door opposite the blasting station removed to show five of the six nozzles that direct a mixture of water and "Micro-mist" abrasive against that part of the casting that is to receive the satin sheen

grille, illustrated in the article heading, adds interest to the interior of the car by the pleasing contrast between the satin-like sheen of the vapor blasted central strip and the bright bands on either side of the central strip.

A chemical immersion non-electrolytic treatment for aluminum and its alloys, including the aircraft alloys, has been developed. This process produces a protective coating and paint base in accordance with Government Specification AN-C-170.

Research with human bones by Frank C. Smith of the National Bureau of Standards has indicated that ordinary laboratory techniques and instruments may be applied to obtain the much needed data on the mechanical properties of bone — knowledge necessary in predicting body behavior under impact loads as encountered in aircraft crashes, seat-ejection from aircraft, parachute opening, and exposure to blast. Dr. Paul Calabrisi of the George Washington Medical School and the Naval Medical Research Institute is collaborating in the study, particularly in connection with the anatomical problems encountered. Preliminary but significant results have been obtained in these investigations.

These preliminary data indicate that bone may be considered an elastic, brittle material, having about one-fourth the compressive strength of cast iron and more than twice that of hickory wood. The average Young's modulus of elasticity of the bone is approximately one-tenth that of steel, or about equal to that of wood.



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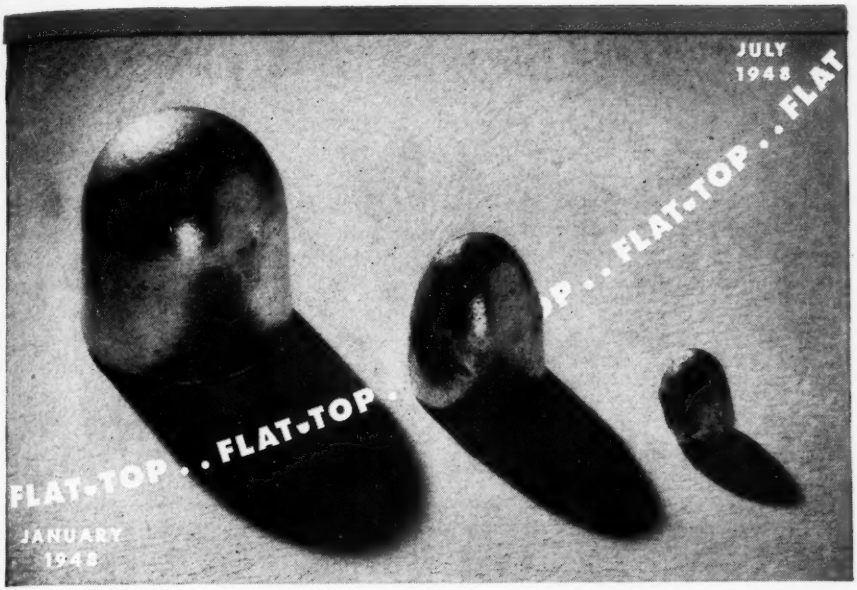

FLAT-TOP . . the Anode You Know is ZINC

BECAUSE ONCE A FLAT-TOP . . . *ALWAYS* A FLAT-TOP

There's a solid reason for a five-fold increase in Wagner zinc shipments since January, 1948. It's that distinctive Flat-Top shape which avoids mixing with cadmium or tin anodes. And Flat-Top retains its recognizable form right through the process. A glance at the basket tells the tale, prevents incorrect reloading, eliminates dumping, saves you labor and material.

Flat-Top is smooth, reducing hanging on basket wires. Made from highest purity zinc obtainable, 99.99+%. Sealed in wooden kegs. Sold by qualified metal-finishing supply houses in principal industrial areas.

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I. C. H. A. M.

SIXTEENTH ANNUAL CONVENTION and EXHIBIT

HOTEL NETHERLAND PLAZA
CINCINNATI
DECEMBER 6, 7, AND 8

J. C.H.A.M. president, Sheldon Coleman, vice president of The Coleman Company, Inc., has announced that at the Sixteenth Annual Convention of the Institute of Cooking and Heating Appliance Manufacturers particular stress will be laid on a well-balanced financial and manufacturing program for 1949.

At the General Session authoritative speakers from other industries and from public life will be asked to outline the probable effects of the November elections on the domestic and foreign policies of the Government, in order that members of the stove industry may attempt to correlate governmental policies and business indicators for 1949.

A new feature of the convention program will be a forum discussion, at which one financial man, a top management executive, a sales manager, and a labor relations official, each from a different stove company, will stress the contributions which must be made by his particular management group if profitable operations are to be continued in this industry next year. At this forum session, attention will also be given to the outlook for raw material supplies, particularly of steel and pig iron.

The sales outlook and, for that matter, the production outlook, is quite different for each of the diversified products made by the members of the I.C.H.A.M. For that reason, the agenda for the various product division meetings will differ widely in order to meet the requirements of the manufac-

turers in each field. The Gas Space Heater and Floor Furnace Division will give attention to the expansion of gas pipeline facilities and the probable effects of such expansion programs on existing restrictions on the use of gas for new heating equipment. The Solid Fuels Division, representing manufacturers of both coal and wood cooking and heating equipment, will review new product developments and promotional ideas for stimulating this market.

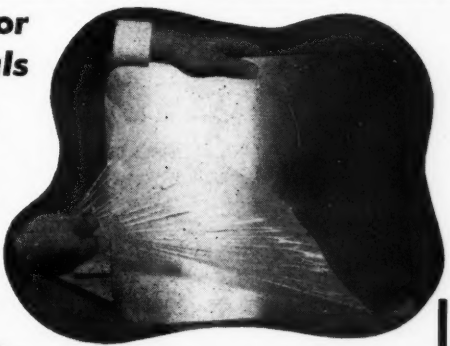
In the Oil Division, fuel supplies and technical problems will be given first consideration, while in the Gas and Electric Range Divisions, new production and merchandising ideas will highlight the discussions.

The convention exhibit and the resulting personal contacts between manufacturers and suppliers will constitute a vital link in the stove industry's future planning. Approximately 75 displays of raw materials, equipment, components, and services used in the production of ranges, space heaters, and water heaters will provide the media through which stove men may keep in touch with up-to-the-minute developments. New materials, new uses for old materials, time and labor-saving equipment, new accessories to add sales appeal to stove products —all these and many more will be featured by the exhibitors.

Exhibits of materials, components, and equipment used in stove production will be open during the entire convention. Exhibits will be located on the third floor, in the Hall of Mirrors, and in the North Hall, fourth floor, Hotel Netherland Plaza. Registration for the convention may be made at the registration desk on the third floor of the hotel.

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust.



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Among many advantages, it is non-toxic, possesses great tensile strength and is easily stripped off in one piece. Write for complete information on this new strippable plastic.

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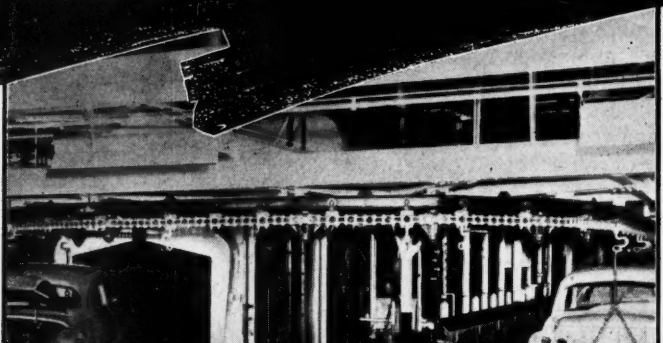
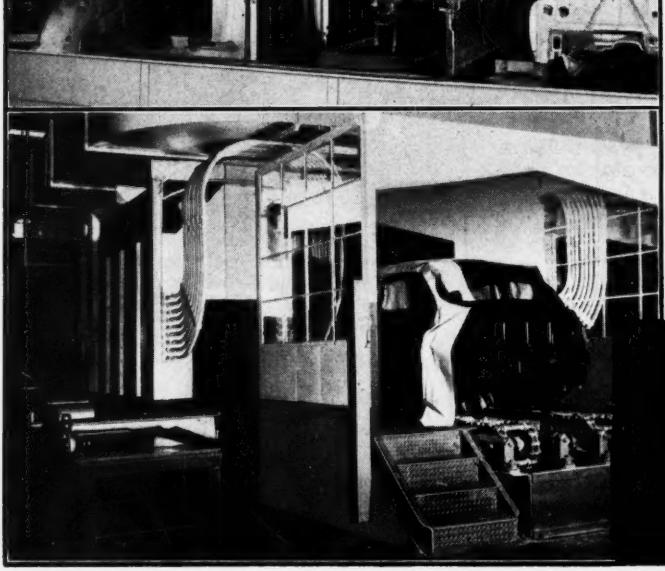
Complete



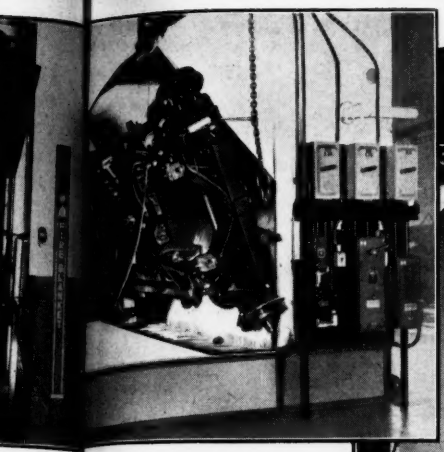
First enamel dry-off after wet sand oven.



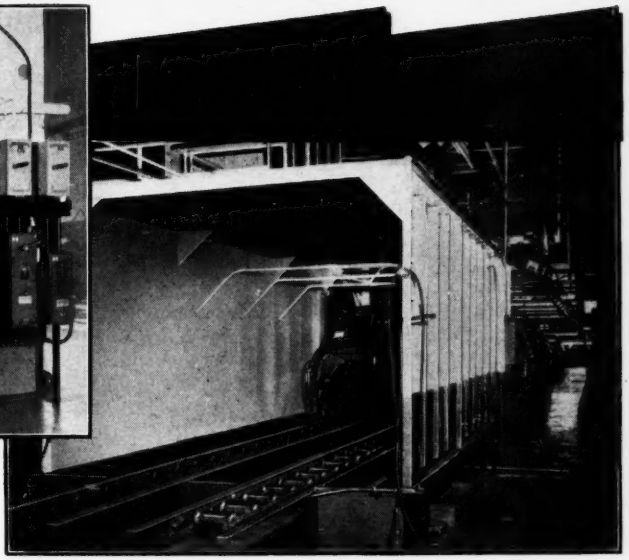
Two-tone and repair spray booth.

see our CATALOG in SWEET'S FILE MECHANICAL INDUSTRIES

PET



ssis-frame spray booth.



Body water test.

The illustrations on this page are pical examples of **PETERS-DALTON** nning and engineering. They w part of the Complete Finishing stem for bodies and miscella- ous parts as installed in the new coln-Mercury assembly plant at Angeles, Cal.

All finishing equipment design was -ordinated with the purchasing gineers in producing a new de- rtmentalized theory of automo- production.

Remember, that in planning a w finishing equipment, a **PETERS-** LTON system gives you Better nning . . . Better Engineering . . . TER FINISH at *lower cost!*

Small parts flo-coat machine.

TERS-DALTON *Inc.*

FORD-WHIRL

Program

Monday, December 6

10:00 A.M.—Board of Trustees
Sheldon Coleman, Presiding

Oil Division Technical Section
Kenneth Jenson, Presiding

1:00 P. M.—Luncheon Meeting of Kerosene Stove Division

2:30 P. M.—Electric Range Division
S. K. Harrington, Presiding

Export Committee
E. A. Travis, Presiding

Marketing Committee
Walter F. Muhlbach, Presiding

Oil Division Executive Committee
John W. Baillie, Presiding

Informal Meeting of Manufacturers of Sleeve-Type Oil Burning Appliances

Tuesday, December 7

10:00 A.M.—General Session
Sheldon Coleman, Presiding

2:00 P. M.—SPECIALISTS' MEETINGS:

Credit Managers
Earl D. Weiland, Presiding

Financial Executives and Accountants
A. F. Jacques, Presiding

Labor Relations Officials
J. B. Tudhope, Presiding
J. Loren Freund, Consultant

Sales and Advertising Executives
A. B. Ritzenthaler, Presiding

7:30 P. M.—President's Reception and Banquet

Wednesday, December 8

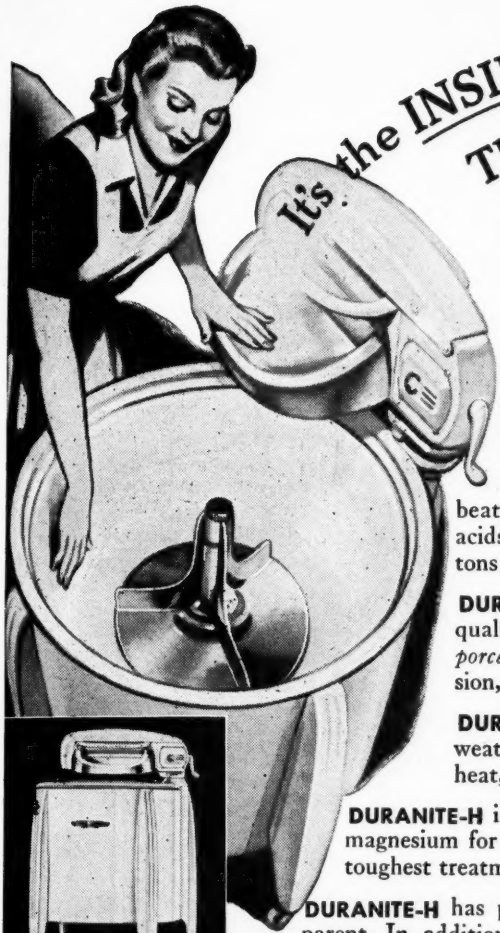
10:00 A.M.—PRODUCT DIVISION MEETINGS:

Gas and Combination Range Division
F. A. Kaiser, Presiding

Gas Space Heater and Floor Furnace Division
R. M. Liedstrand, Presiding

Oil Division
John W. Baillie, Presiding

Solid Fuels Division
William H. Martin, Presiding



It's the INSIDE of a Washer That Takes the Real Beating!

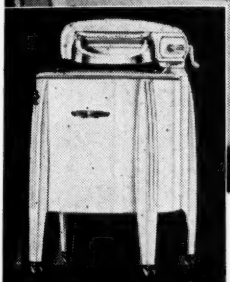
Outside appearance is important to a washer . . . but the *inside* finish—the *working* surface—is even more important! It's the *inside* of the tub that takes the beating from steaming water, soaps, acids, greases, bleaches . . . from buttons and buckles that chip and scratch.

DURANITE-H approaches all the best qualities of porcelain . . . is *superior to porcelain* in impact-resistance, adhesion, flexibility, and economy.

DURANITE-H stands up to outdoor weather . . . is extremely resistant to heat, humidity, salt spray.

DURANITE-H is applicable over steel, aluminum, magnesium for a gleaming finish that takes the toughest treatment.

DURANITE-H has primary advantages that are apparent. In addition, it has scientifically developed qualities for specific products that can be the solution to *your* particular problems. For more complete data, write us.



DURANITE-H used on the tub of Speed Queen Washer by Barlow & Seelig.

ZAPON

List of Exhibitors

Firm	Product	Booth No.
Aluminum Goods Manufacturing Company, Manitowoc, Wisconsin	Deep-well and pressure cookers	28
Armco Steel Corporation, Middletown, Ohio	Enameling iron; steel sheets	52
Ark-Les Switch Corporation, Watertown, Massachusetts	Electrical switches	69
Breese Burners, Inc., Chicago, Illinois	Vaporizing pot-type oil burners	29
Bryant Heater Company, Cleveland, Ohio	Automatic controls for ranges	74
Bundy Tubing Company, Detroit, Michigan	Tubing for gas stoves	50
Chicago Mill and Lumber Company, Chicago, Illinois	Crates and shop boxes	16
Cole-Sewell Engineering Company, St. Paul Minnesota	Draft controls; testing equipment	32
Continental Wire Corporation, York, Pennsylvania	Range wire	72
Cooper Oven Thermometer Company, Pequabuck, Connecticut	Oven thermometers	3
Croname Incorporated, Chicago, Illinois	Name plates; stove trim	49
Cutler-Hammer, Inc., Milwaukee, Wisconsin	Electrical heating units; water heater units, thermostats	27
Detroit Brass & Malleable Works, Detroit, Michigan	Gas valves and fittings	25
Dover Stamping Company, Boston, Massachusetts	Tanks and sumps	1
Electrical Testing Laboratories, Inc., New York, New York	Examples of ETL test procedures	26
The Fahralloy Company, Harvey, Illinois	Heat resistant castings	67
Ferro Enamel Corporation, Cleveland, Ohio	Porcelain enameling furnaces and service	39
Field Control Division of H. D. Conkey & Co., Mendota, Illinois	Barometric draft controls	46

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988-Shop Coat Primer-

Synthetic, five to six minute flash air dry, or can be baked 20 to 30 minutes at 300°. Pleasing color, excellent adhesion to all metals. Compatible with succeeding coats of lacquer or synthetics. Economical application, excellent hiding. Prompt delivery.

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Specially formulated for steel stampings in electrical and allied industries. Outstanding adhesion, toughness and opacity. Available in any desired sheen. A quality product of proven performance.

Water-Dip Clear-

A synthetic protective coating which prevents oxidation and finger printing of all plated surfaces. Instantaneous dry.

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LIST OF EXHIBITORS—*Continued*

Firm	Product	Booth No.
Fisher Process Mfg. Co. Chicago, Illinois		63
General Electric Company Schenectady, New York	Heat resisting wires; wiring accessories; range timers	20-21
General Lamps Manufacturing Company Elwood, Indiana	Stove lamps	31
Glidden Co., Nubian Paint & Varnish Div. Chicago, Illinois	Industrial coatings	37-38
Grigoleit Company Decatur, Illinois	Stove hardware	17
Harper-Wyman Company Chicago, Illinois	Center simmer burners and gas filters	30
The Hart Manufacturing Company Hartford, Connecticut	Thermostats; switches; wiring devices	14
O. Hommel Company Pittsburgh, Pennsylvania	Porcelain enamel frit; oxides; clay; spray guns	2
Interchemical Corp., Finishes Division Newark, New Jersey	Industrial finishes	48
Keeler Brass Company Grand Rapids, Michigan	Stove hardware	41
Krueger Sentry Gauge Company Green Bay, Wisconsin	Fuel oil gauges	64
John Lees Division of the Serrick Corp. Muncie, Indiana	Stainless steel mouldings; stove trim	8
Lincoln Brass Works, Inc. Detroit, Michigan	Valves; burners; lighters	73
Lux Clock Manufacturing Company Waterbury, Connecticut	Minute minders; range minders	7
The Merchandise Mart Chicago, Illinois	Marketing facilities	45
Mills Engineering Company Detroit, Michigan	Product design; engineering; development	65
Moe Brothers Manufacturing Company Fort Atkinson, Wisconsin	Lamps; deep-well and pressure cookers	19
National Lock Company Rockford, Illinois	Handles; hinges; catches; screws and bolts	51
New Monarch Machine & Stamping Co. Des Moines, Iowa	Stampings; assembly service	24

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Firm	Product	Booth No.
Owens-Corning Fiberglas Corporation Toledo, Ohio	Fiberglas insulation	9-10
Patrol Valve Company Cleveland, Ohio	Lighters; filters; valves; connectors; corrosion protectors	53
Penn Electric Switch Company Goshen, Indiana	Automatic controls	62
Porcelain Enamel Institute, Inc. Washington, D. C.	Porcelain enamel	13
Production Plating Works, Inc. Lebanon, Ohio	Manifolds	4
Pyramid Mouldings Incorporated Chicago, Illinois	Mouldings; metal stampings	61
Redmond Company, Inc. Owosso, Michigan	Fractional horsepower motors; blowers; speed controllers	18
Reflectal Corporation New York, New York	Asbestos insulation (reflective type)	71
M. H. Rhodes, Inc. Hartford, Connecticut	Timers, porcelain pottery combinations	11
Roberts Brass Mfg. Company Detroit, Michigan	Valves; filters; burner fittings	33
Robertshaw-Fulton Controls Company Greensburg, Pennsylvania	Thermostats	35-36
Rockbestos Products Corporation New Haven, Connecticut	Electric range and lead wires	5
W. J. Schoenberger Company Cleveland, Ohio	Range and heater valves	15
Seth Thomas Clocks Thomaston, Connecticut	Clocks and timers	60
Sheet Metal Specialties Company Worcester, Massachusetts	Oil tanks	66
Shepherd Manufacturing Company Muncie, Indiana	Stove lamps	40
Silent Glow Oil Burner Corporation Hartford, Connecticut	Sleeve-type oil burners	12
Sterling Bolt Company Chicago, Illinois	Bolts; nuts; screws; rivets; screw machine parts	6
Telechron, Inc. Ashland, Massachusetts	Clocks; motors; timers	44

Booth No.
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CHROMIUM PLATING . . . pure "Krome Flake" 99.8% CrO_3 . . . sulphates less than .10% . . . lead, tin-lead and antimony-lead anodes.

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TIN PLATING . . . cast tin anodes . . . sodium stannate . . . stannous sulfate . . . tin fluoborate . . . acid tin addition agent.

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Firm	Product	Booth No.
Tinnerman Products, Inc. Cleveland, Ohio	"Speed Nut" and "Speed Clip" fastenings	22-23
H. W. Tuttle & Company Adrian, Michigan	Electric heating units	70
Union Steel Products Company Albion, Michigan		68
Universal Electric Company Owosso, Michigan	Fractional horsepower motors	58
Verson Allsteel Press Company Chicago, Illinois	Brakes; presses and punching machines	47
Western Foundry Company Tyler, Texas	Castings	59
Wilcolator Company Elizabeth, New Jersey	Thermostats	42-43
Winters & Crampton Corporation Grandville, Michigan	Stove hardware	34

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Fit *all* your tanks, new and used, with Singleton H-T Lucite Tank Liners! Sensational, proven performance, unequalled throughout the industry. They resist all acids, alkalies, even super-active mixtures at 220° F. No contamination, no deterioration, no current losses. Leakproof and shatterproof. Lightweight for easy handling, machineable for utility.

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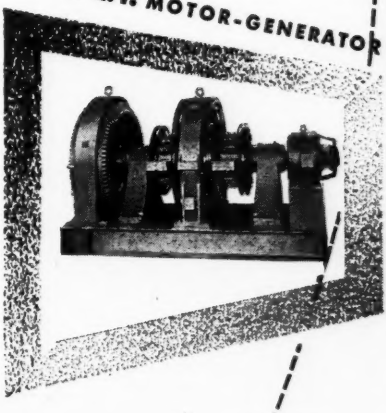


EP X-41

THE ELECTRIC PRODUCTS COMPANY

1741 CLARKSTONE ROAD CLEVELAND 12, OHIO

Finishing Clinic

Surface Preparation for Organic Finishing

By DR. ALLEN G. GRAY

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

PRESENT-DAY demands for increased corrosion resistant finishes on metal products have resulted in more durable organic coatings and improved scientific methods for preparing metal surfaces to receive and retain an acceptable type of organic finish. The "quality conscious" finishing engineer should always bear in mind, that, in general, the useful life of any organic finish depends on two major factors—the durability of the organic coating film itself and the adherence of the film to the surface to which it is applied. The method of preparation of metal surfaces for organic coatings contributes a great deal to the adhesion characteristics of the overall finish and is one of the most important phases of the organic finishing cycle.

The most widely used methods of preparing metal products for organic coatings may be classified as follows:

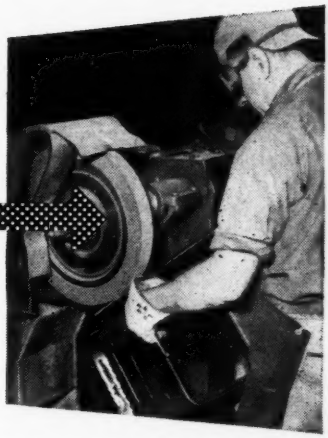
I. Methods which do not materially change the surface characteristics of the metal.
II. Methods which mechanically or chemically alter the surface characteristics of the metal.
III. Methods which convert metal surfaces to a non-metallic coating adapted to inhibiting corrosion and increasing the adhesion of applied organic finishes.

Group I methods include various types of alkali, emulsion, and organic solvent (trichlorethylene) cleaning which constitute the simplest methods used in preparing a metal product for an organic coating. These methods pro-

THIS MONTH . . . Surface Preparation for Organic Finishing . . . Continuous Carbon Treatment of Plating Solutions May Contribute to Quality Plating . . . Mechanism of Film Formation in Organic Coatings . . . Preparation of Aluminum for Plating.

The Backstand-Belt Method of Production Grinding, Polishing and Finishing offers

NOT 1 BUT 5 ADVANTAGES



For grinding, polishing and finishing hundreds of consumer and industrial items, the backstand-belt method is more efficient and economical than the older set-up wheel method—because the backstand-belt has these five advantages over the set-up wheel...

a b

1. An abrasive belt is a scientifically made tool, manufactured under controlled conditions by experts using modern making equipment. The photomicrographs compare the crude, uncontrollable rolled-on cutting surface of (a) a typical set-up wheel with (b) the coating on an Armour Abrasive Belt. The sharp cutting points on the factory coated belt are exposed to provide faster, cleaner cutting action, increased production.

2. Coated abrasive belts cut cooler because of a longer interval between work contacts.

3. Inexperienced help can be quickly trained to operate a backstand-belt machine. Highly skilled personnel needed to dress the wheels can be used elsewhere.

4. It takes only a few seconds to change a coated abrasive belt.

5. Temperature-controlled room for curing set-up wheels can be released for other uses.

Actually, there are more than five advantages to the backstand-belt method. For additional information send coupon at left for our new informative booklet—"Facts about Backstand-Belt Grinding and Polishing."

The McCaskey Register Co., manufacturer of cash registers and bookkeeping equipment, improved polishing and deburring time on stamped out register covers 40% by switching to the backstand-belt. Whether you are polishing flat or contoured surfaces, cast, stamped or forged pieces, try backstand-belts.

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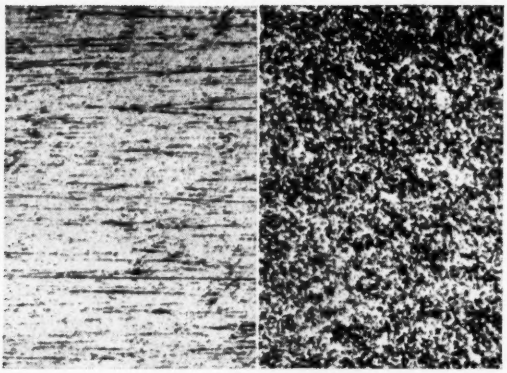

Fig. 1—Changes in the surface of finished steel after application of a commercial phosphating process known as Bonderizing: (a) untreated; (b) phosphate coated

vide only for the removal of foreign matter, grease and oil without imparting any material change in the surface of the metal.

Group II methods of surface preparation include mechanical means of preparation such as sand and shot blasting, which roughen the surface so that organic coatings will more readily adhere. Included in this same group are chemical methods of preparation, such as ordinary acid pickles and others, which may involve the use of phosphoric acid and a grease solvent to clean and etch the metal surface to provide better adhesion of applied paint finishes. These methods generally impart a roughness to the metal surface which increases initial adhesion of applied paint finishes but does not provide any appreciable protection for inhibiting corrosion of the metal.

It is generally advisable that metal products be freed of oil and grease before they are sand blasted or shot blasted. This precaution prevents the abrasive material from becoming contaminated. Ordinary acid pickling removes scale from metal and etches the surface. However, is should be remembered that this operation must be followed by a thorough water rinse to ensure the removal of any adhering metal salts. The primary factor in the pickling operation is to remove scale and to etch the metal surface, thereby providing better adhesion for the final paint finish. Acid cleaning of metal with phosporic acid and a grease solvent is sometimes used to remove grease and etch the metal surface in one operation. Following all acid cleaning processes, it is important to rinse the metal thoroughly and dry it well before painting.

Group III methods of surface preparation include those processes which convert metallic surfaces to a nonmetallic coating, which inhibits corrosion and increases the adhesion and resultant durability of applied organic finishes. This method of metal preparation requires the removal of all grease and foreign matter from the surface of the metal by the methods of Group I or II, prior to the formation of the protective conversion coating on the surface. Instead of activating the metal, such as results from acid etching and mechanical blasting, the surface is converted into a more stable and less reactive medium as a base for paint. Thus, because of the increased resistance to corrosion, metal products prepared for organic finishing by the use of such conversion coatings do not have to be painted immediately to prevent rust.

In general, commercial phosphating is carried out after fabrication of articles, preferably immediately before painting, either by immersion of the article in the phosphating solution or by spraying the solution onto the articles which are to be coated. In the industrial finishing line very small parts which can be more conveniently han-

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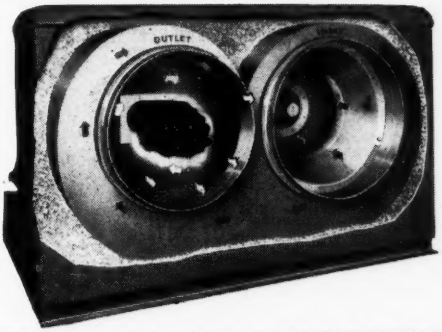

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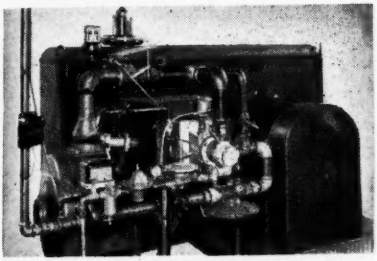

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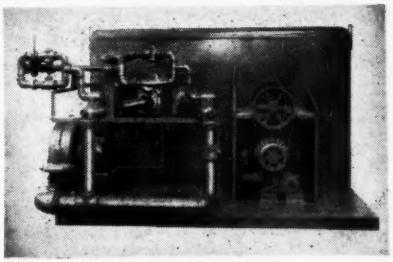

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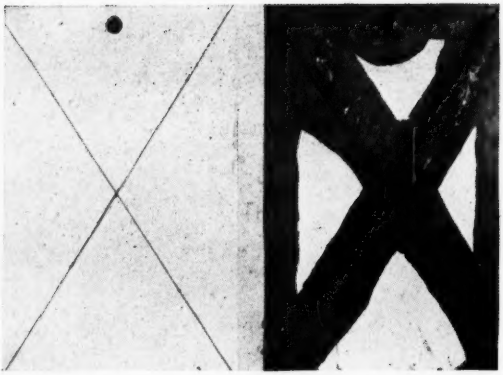

Fig. 2—Effect of phosphate coating on salt spray test on finished steel. According to tests carried out in the Parker Rust Proof laboratories, test panels (a) and (b) above were given the same type of refrigerator finish; however, (a) was given a commercial phosphate coating by the Bonderizing process while (b) was finished over plain cleaned steel. Both were subjected to standard A.S.T.M. salt spray test for 120 hours.

dled as a unit load are treated by immersion application, while larger parts, such as refrigerator cabinets, automobile bodies and fenders, are treated by spray application. One factor of importance to rapid finishing schedules is that commercial phosphating processes have advanced to the point that the immersion process requires only 2 to 5 minutes for application of the coating and the spray processes 45 seconds to one minute.

In Fig. 1 is shown the difference in the surface of cold rolled steel after a commercial phosphate treatment known as "Bonderizing." In addition to providing for increased adhesion of organic paint finishes, phosphate coatings of this type are known to reduce the activity of the metal, and by so doing help to prevent underfilm corrosion at the paint-metal interface, and at the same time prevent the spread of corrosion from scratched or abraded areas in the paint film. This is illustrated in Fig. 2 showing the results of the salt spray test on a typical refrigerator enamel applied over two test panels, one of which was cleaned and the other phosphate treated.

Acid-Ratio In Phosphatization of Steel

In connection with the use of phosphate conversion coatings as a preparation for organic finishing of metal products, one of the features of the recent 35th annual convention of the American Electroplaters' Society, held at Atlantic City, was a discussion of some of the factors affecting the formation of phosphate coatings on steel products by Nelson F. Murphy, research professor in chemical engineering, Virginia Polytechnic Institute, Blacksburg, Va., and Michael A. Streicher, presently at Lehigh University and formerly a Du-Lite Chemical Corporation Fellow at Syracuse University. According to Murphy and Streicher, factors which affect the time of formation and quality of phosphate coatings are temperature, presence of accelerator, concentration of the phosphating solution, and the cleaning procedure used. The authors also brought out experimental data which emphasized the importance of control of the acid ratio.

The "acid ratio" in phosphate coating baths was defined as the ratio of the concentration of "total acid" present to "free acid." The "total acid" is found by titration of a sample of solution with 0.1 N sodium hydroxide using phenolphthalein as an indicator (end point, pH 8.6). The "free acid" is found by titration of the same size sample with the same solution of sodium hydroxide using bromphenol blue as an indicator (end point, pH 4.4). The phenolphthalein titration divided by the bromphenol blue titration is taken as the acid ratio. Thus, the acid

Finest finishes are applied after Bonderizing. Automobiles, kitchen equipment, washers, ironers, dryers, tractors and garden tools, lawnmowers—the list could go on to include almost every type of painted steel article on which lasting appearance is important.

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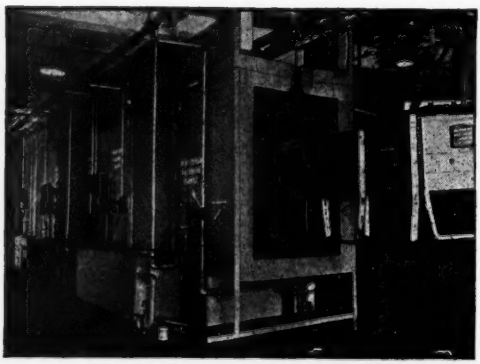
ratio is a sensitive indicator of the acidity of the bath in relation to the total chemical concentration. A low acid ratio indicates a more acid solution and a high ratio a less acid solution. A straight-line relationship exists between pH and acid ratio in the phosphate coating solution used for this study which consisted of 1.5 to 3.0 g./l. primary zinc phosphate, 3 to 4 g./l. phosphoric acid, and an oxidizing agent, which served as an accelerator.

It was emphasized that the acid ratio must be kept within definite limits. If the ratio of total to free acid to too low; that is, the free acid is too high, the treatment time is too long and the protective value of the coating is reduced owing to the decrease in the tertiary phosphates in the coat. If the free acid content is too low, precipitation of insoluble phosphates will occur throughout the solution. If the absolute concentration of the bath is too low, the pH of the bath increases so rapidly in operation that precipitation of insoluble phosphates occurs. If the absolute concentration is too high, the pH is not increased rapidly enough at the interface and treatment time is excessive.

In a bath having a low acid ratio, it was pointed out that profuse hydrogen bubbling may take place and the coat produced may be coarse. Such a coat was described as having low corrosion resistance, and large coarse crystals, causing a sparkling coat. This effect can be counteracted somewhat by increasing the concentration of oxidizing agent, but was stated to be an expensive and inefficient procedure. A phosphate coating bath having a high acid ratio was described as a slow bath with a tendency toward excessive sludge formation.

A phosphate bath having an acid ratio of 3.8 to 4.0 or less will cause articles to lose weight. If the ratio is above this value, the articles will gain

Phosphate Coating Machine



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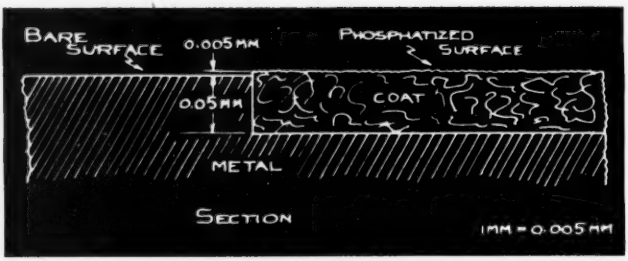

Fig. 3—Diagram of a cross-section of phosphate coating on steel

weight regardless of the cleaning procedure. The turning point depends on the composition and treatment of the metal being phosphatized. Whether an object will gain or lose weight depends on the acid ratio and the cleaning process used.

According to data given by Murphy and Streicher, the thickness of a phosphate coating is usually given as from 0.005 to 0.01 mm. Experiments were carried out to determine the change in dimension of an article during phosphatization, since it was realized that such a change is the result of two opposing factors; namely, dissolution of the metal and building up of the coat. In studying the change in dimension, one-half of the test panel was immersed in the solution, following which the thickness of the uncoated metal and the coated section was found by the micrometer. Thus, as pointed out, the difference between the thickness of the coated and bare section divided by two gave the change for each surface. Using this method, it was reported that the average change in dimension of a panel in a freshly prepared bath was found to be an increase of 0.005 mm., where a medium heavy coat was applied, with 5 to 10-minute immersion time.

To find the actual thickness of the coat, further experimental work was carried out, whereby a cross section of a phosphatized panel was photographed at known magnifications. The thickness of the coat was measured on the photographic plate. The approximate value reported for a medium heavy coat on an alkali cleaned panel was 0.054 mm. Figure 3 illustrates the cross-section of the coating, and shows that the thickness of the coat protruding above the original surface of the metal is only a small part of the total thickness of the phosphate coating.

Commercial Phosphate Coating

In discussing the composition and type of coatings produced in commercial phosphating operations for the "Corrosion Handbook," sponsored by the Electrochemical Society, (recently published by John Wiley & Son), V. M. Darsey, Parker Rust Proof Company, indicated that the most commonly used coating solutions contain zinc and iron or manganese and iron phosphates, which react chemically with the metal until the surface is converted into a crystalline phosphate coating; an oxidizing agent is generally used to accelerate the formation of the coating. A distinct difference should be noted between this type of conversion coating process, and that produced by certain phosphoric acid cleaners, which may consist of phosphoric acid, together with an organic grease solvent, used with or without a wetting agent. In this case the acid concentration is such that formation of any substantial phosphate coating is prevented, as compared with the use of dilute acid-phosphate solutions containing metal phosphates, which results in the formation of a visible crystalline phosphate surface coating.

The immersion type of phosphatization installation, based on the re-

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quirements of one commercial process known as Bonderizing, requires a tank, fitted with suitable equipment for heating the solution, in which the production is dipped by means of racks, baskets or other similar devices, together with the necessary complementary cleaning and rinsing tanks. This type of setup is particularly adapted to the needs of the finisher whose production requirements are limited. Where the amount of material to be processed is large, spray methods are used, using a tunnel arrangement such as illustrated in Fig. 4, where the various steps of cleaning, rinsing, and phosphatization take place automatically. In most finishing cycles production normally passes from the phosphate coating section through dual rinsing, which may involve a special rinse, on to final finishing where the coating is applied. However, in some instances to eliminate moisture before organic coating, a dry-off oven is included at the end of the conveyorized line.

Continuous Carbon Treatment of Plating Solutions May Contribute to Quality Plating

THE application of activated carbon to the continuous purification of plating solutions is very simple and is considered by many production platers to be cheap insurance against varying quality of deposits as well as avoiding the necessity of periodic batch carbon treatments. Briefly, it comprises circulating the solution through a layer of activated carbon deposited upon a filter. In general, any plating bath which does not contain organic addition agents that are removed by the carbon will respond to continuous carbon treatment. If continuous carbon treatment can be used, it has several very distinct advantages. The solution is protected at all times against harmful impurities, both of the regularly accumulated type and of the type accidentally introduced. Furthermore, since the solution is being filtered con-

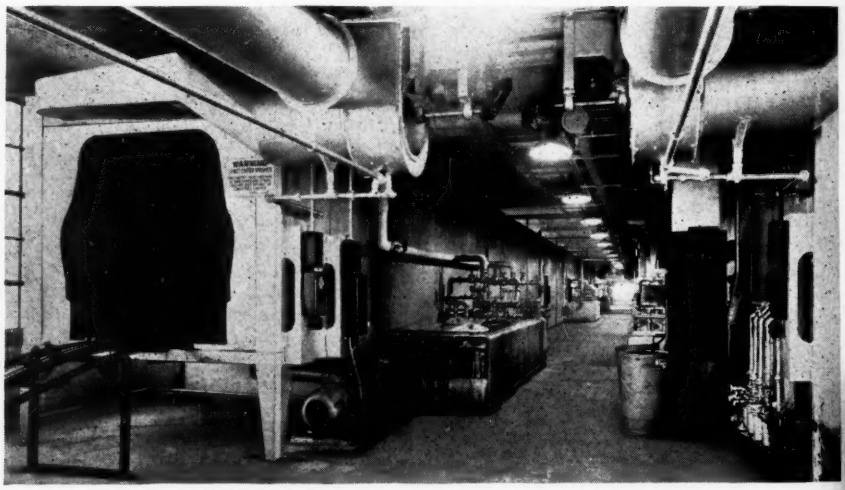
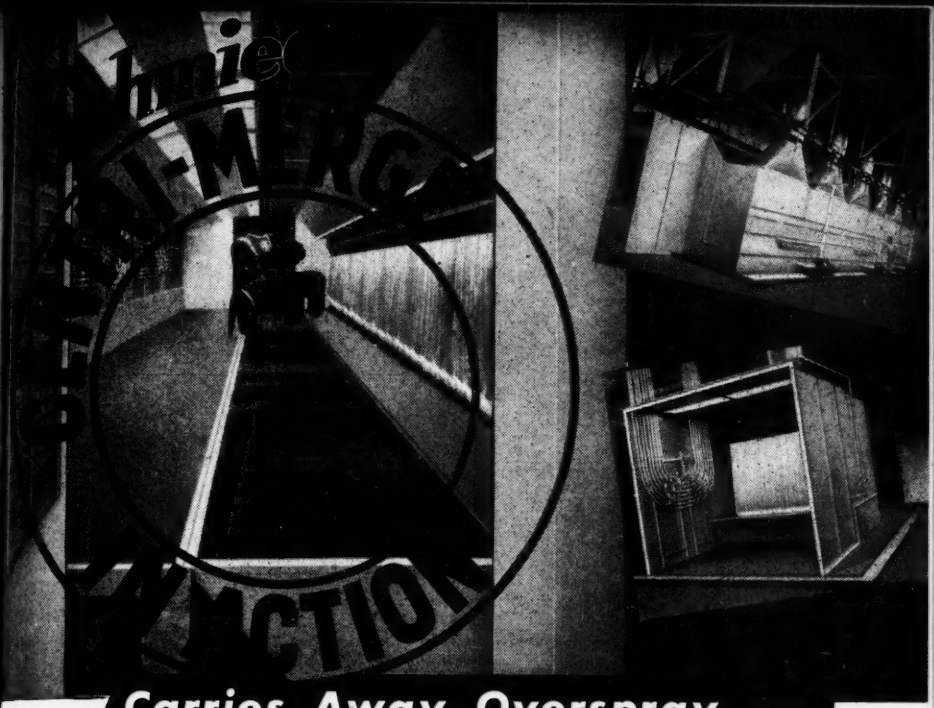


Fig. 4—Tunnel arrangement for large scale cleaning and phosphate treating of automobile bodies
(Photo courtesy The R. C. Mahon Co., Detroit 11, Mich.)



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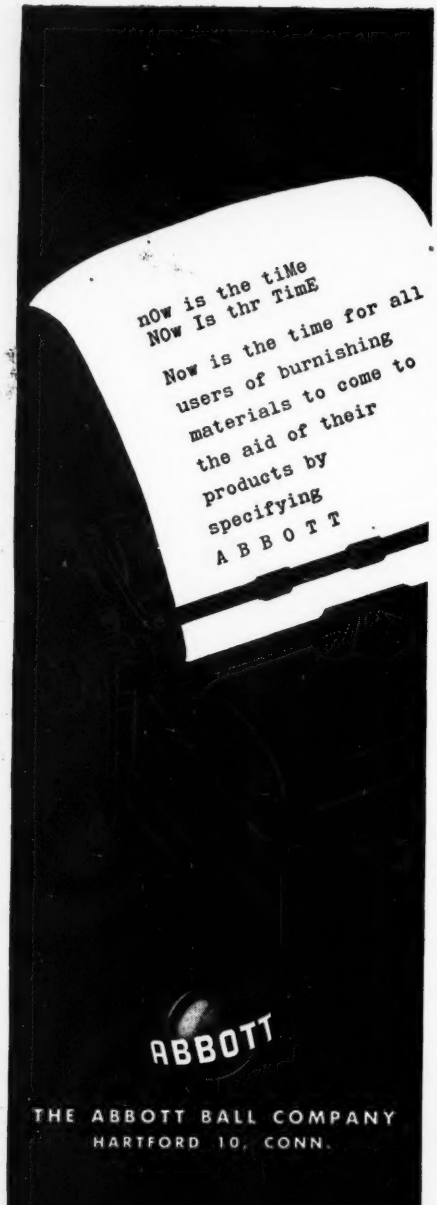

tinuously, it is also at all times in a state of maximum clarity or freedom from suspended matter.

Starting with a clean filter, as a first step in setting up a procedure for constant filtration, the filter cloths or filter papers should be precoated with a reasonable light coating of filter aid. Unless the filter comes equipped with a slurry tank which should include an agitator, an auxiliary tank, preferably rubber lined, or an appropriate crock, should be made available as a slurry tank. Activated carbon in the required amounts should be added to the slurry tank which is partially filled with water. A mixture of activated bentonite and carbon has been recommended for treatment of bright nickel plating solutions by this procedure. Also, it is generally advisable to add filter aid to the slurry tank along with the activated carbon. The slurry is drawn into the filter and circulated continuously until the solution retained in the slurry tank is perfectly clear. The filter is then ready for operation on a continuous basis with the plating solution.

One point to keep in mind in charging the filter is to use a rather dilute slurry and not to charge at too rapid a rate, so as to avoid depositing an uneven layer of carbon and filter aid over the filtering area. Although the production man will soon learn by experience the proper amount of carbon and filter aid to use with a given filter, a rule that has been followed in the plating room is not to use sufficient charging materials to reduce the filter flow more than 50 to 60 per cent. There is a great deal of variation in amounts and kinds of impurities in the different plating baths from plant to plant, and thus no definite statement can be made with reference to the amount of carbon needed. There have been instances where one pound of activated carbon used in 24 hours per 1,000 gallons of plating solution has kept the solution free from harmful organic contamina-

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tion when used in a system of continuous treatment. However, it is better to use a little more carbon than actually necessary, rather than take a chance on the bad effects of organic impurities.

* * *

Mechanism of Film Formation in Organic Coatings

ONE of the important points brought out by Dr. E. E. McSweeney, supervisor of much of the work being carried out on organic coatings at Battelle Memorial Institute, in a recent discussion of organic coatings in "Plating," is that almost without exception baking of coatings for metal products produces films with better hardness, flexibility, chemical resistance and durability than does air drying; in fact, even lacquers which undergo no chemical change on heating produce more dense, adherent films when baked.

Organic finishes protect metal products by virtue of the interposition of a continuous, inert and adherent film between the surface of the metal and its environment. Whereas, in the case of metallic finishes over metals the electrochemical relationships between environment, coating and base metal play a predominant part in determining the efficacy of the coatings, such relationships, in general, play a relatively minor part in the field of organic finishes. Instead, the factors that determine the degree to which the environment can be blocked off mechanically from reaction with the corrodible metal assume major importance.

It is generally recognized that the durability and service behavior of all organic coatings is, to a large extent, determined by the physical structure of the coating film and the manner in which this structure may change upon aging. Organic coatings for metal products include a host of enamels, lacquers, and paints which serve largely to isolate the metal from its environment. They are effective on metals, based to a large extent on the effectiveness with which they limit diffusion of both moisture and oxygen. Many modern organic finishes for metal products incorporate corrosion inhibitors in the paint coating next to the metal, which coating is known as a primer coating.

The present-day trend to rapid finishing schedules, whether by air drying or baking, has led to the development of numerous formulations based on synthetic resins. While many methods have been used to classify organic coatings, one method that has been used with considerable success is based on the mechanism of film formation; that is, the process by which the coating in liquid form is transformed into a thin, relatively uniform, adherent film on the metal product. Aside from

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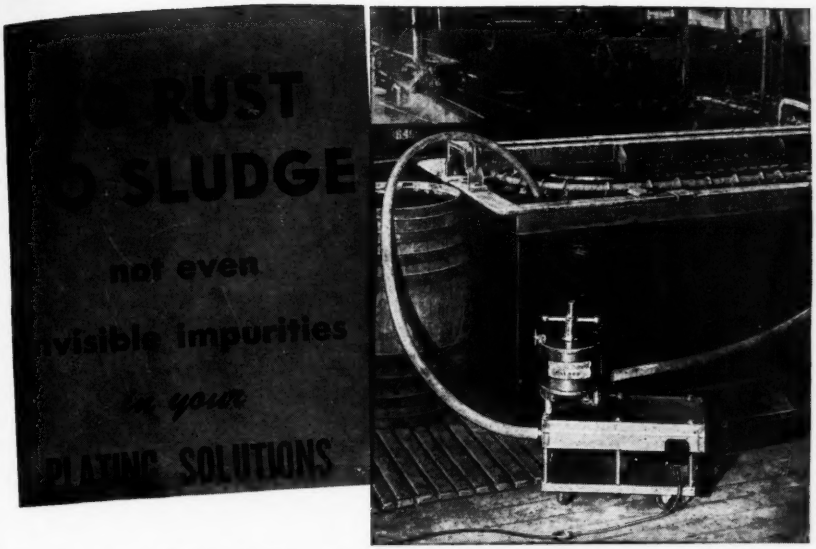

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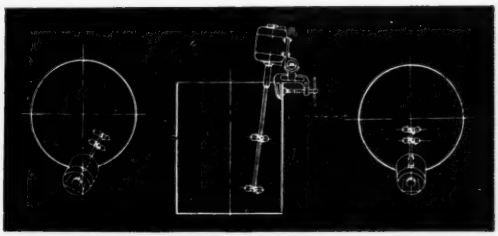

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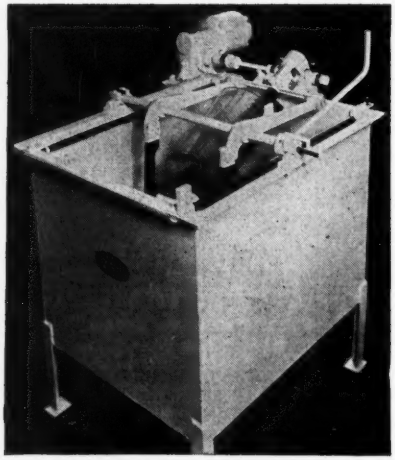
the general process of solidification such as is obtained with the wax type coatings, there are three general mechanisms involved in film formation with organic coatings; namely, (1) solvent evaporation, (2) oxidation, and (3) polymerization. It should be remembered that the determining factor in film formation is the coating vehicle; the solvent also plays a role but the pigment is relatively unimportant.

To secure application properties, many resins are dissolved in a suitable solvent; after application, the film forms rapidly by solvent evaporation. The rate of drying is governed by the volatility of the solvent and by the "solvent-release" characteristics of the resin. In view of the fact that no chemical change is involved, a very rapid rate of drying can be achieved. However, from the production man's standpoint, it should be noted that the last few per cent of solvent usually evaporates very slowly so that force-drying, at temperatures up to 180 deg. F. or higher, is often used to develop maximum hardness quickly and thereby speed up production schedules. In this class are included the lacquers, which, on the whole, are quite versatile in their properties and appearance.

Many organic coating materials, applied as liquids, form films by an oxidation-condensation reaction process, which in itself is not too well understood. Linseed oil and the oleoresinous varnishes are typical of this group, which absorb oxygen from the air, resulting in a condensation reaction, leaving a hardened film on the metal surface. The alkyd resins, one of the most widely used industrial coating materials, belong in this general class. Although the coatings in this classification all dry by oxidation at room temperature, they may also be baked at elevated temperatures. Although it has been reported that no great change in film forming properties is noted up



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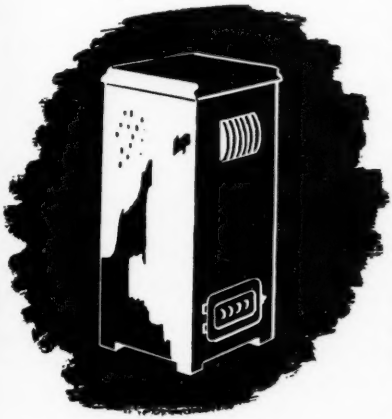
Stays Black at 1000° F



FOR SPACE HEATERS, a new "Vedoc" finish—"Combustion Chamber" Black—stays black in service. Its pigment remains and stays black at temperatures as high as 1000° Fahrenheit. It protects the chamber from rusting, and continues its protection after the vehicle has completely converted—yet gives off a minimum of fumes when the heater is put into service.

VEDOC "Combustion Chamber" Black air dries in 10 to 15 minutes, and can be baked at high or low temperatures. The low cost of this attractive new finish makes it very desirable to use on all modern base burners.

Vedoc

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All "Vedoc" finishes are developed for a specific use, then slightly varied to best fit into each customer's set-up. For more information about these "better finishes" write . . .

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to about 160 deg. F., above this temperature a change in the mechanism of film formation occurs and condensation and polymerization reactions become predominant, although it is generally believed that some oxidation is essential. Almost without exception, it has been found that baking improves the quality of the film produced.

The thermosetting coating materials are used in a partially converted condition, the final curing to an insoluble, infusible, corrosion resistant film being obtained after application by baking. The oldest member of the thermosetting group of resin baking finishes is the condensation product of phenol and formaldehyde. When this reaction is carried to its limit, an insoluble, infusible resin results which is very useful as a structural material, but not as a coating. The reaction can be interrupted, however, at a point where the resin is soluble in alcohol and this can be applied to a surface on which the final conversion can be achieved. This converted film rates very highly in regard to corrosion resistance. Other members of this group of resins are the ureas and melamines, which are widely employed with the alkyds to produce finishes for many types of modern products such as refrigerators, washing machines, and so on. Newcomers to the group of heat-convertible resins are the silicones which are characterized by the unusually high heat resistance of the cured film.

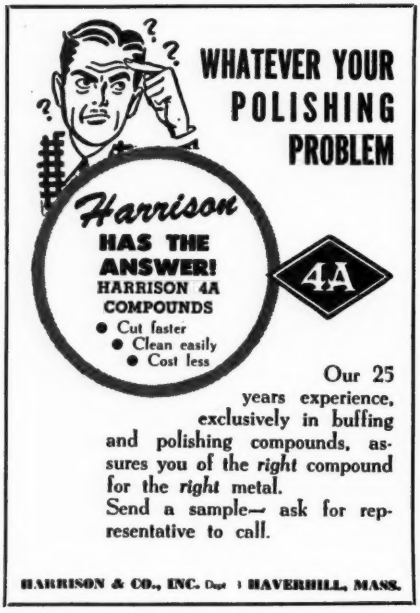
* * *

Preparation of Aluminum for Plating

PLATERS dealing with aluminum base metals are recognizing the fact that the importance of surface preparation canot be too strongly stressed. In the use of the zinc immersion process for electroplating on aluminum, according to work carried out in the laboratories of the Aluminum Company of America, a very important step is the treatment of the aluminum alloy surface before immersion in the zincate bath.

The importance of surface preparation was first indicated by the fact that a polished aluminum surface took a better electroplate than an "as rolled" or "as cast" surface. This indicated that certain surface impurities or contaminants were responsible for these difficulties. These impurities could be oxide or dirt imbedded in the surface from rolling or casting operations.

Cleaning procedures have been found which remove the offending impurities yet do not appreciably roughen the surface. As a result, it is now possible to apply electroplates over the prepared surface which is readily color buffed, or it is possible to apply bright deposits which do not require buffing. These cleaning procedures vary somewhat, depending upon the character of the base metal; that is, whether it be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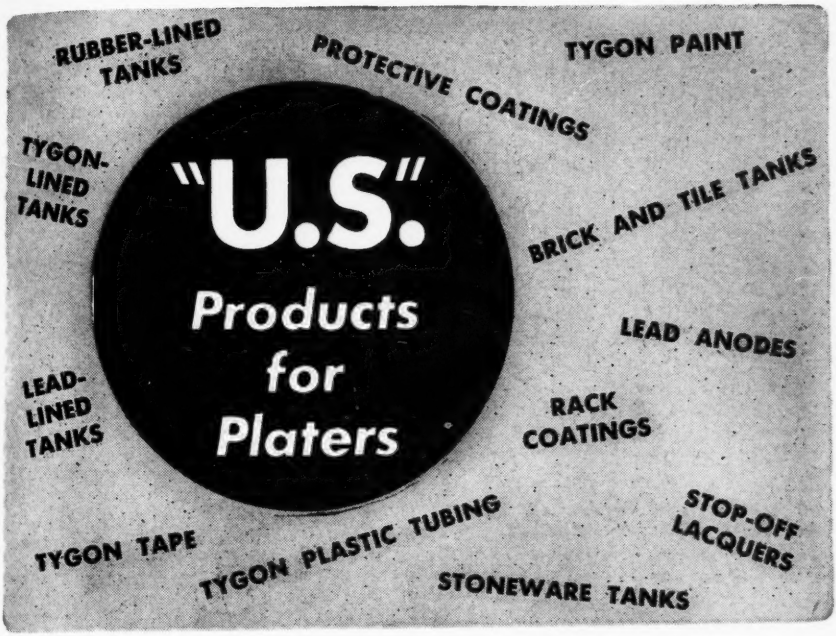

Each of U. S. Stoneware's many products for platers has been developed with two thoughts kept constantly in mind: (1) to lower plating costs, (2) to improve plating quality.

Designed and built by engineers and chemists expert in the selection and use of corrosion-resistant materials. "U. S." products for platers have been field-tested, field approved.

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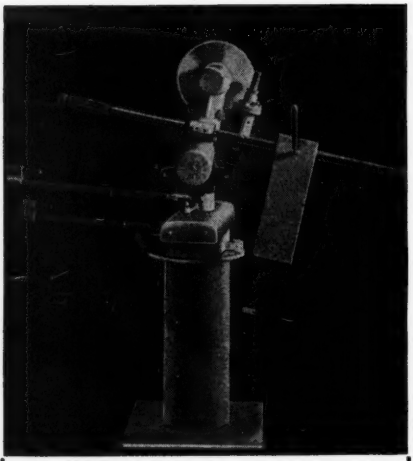

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wrought or cast, and in part, upon the composition of the aluminum alloy.

If much oil or grease is present, as from machining or polishing operations, vapor degreasing or similar solvent cleaning is necessary. If a uniform film for plating is to be obtained in the zinc immersion pretreatment, it is important that the surface be free from embedded soil, such as buffing dirt, drawing lubricants and surface inclusions.

Following preliminary cleaning, a mild alkaline cleaner is advisable. If a commercial cleaner is used, it should be of the type designed for cleaning aluminum; that is, one which is inhibited so as not to attack aluminum. An exception to this procedure is that for castings, in which case a light caustic etch is desirable. If it is desired to prepare a suitable cleaner, the following composition has been recommended by the Aluminum Company of America:

sodium carbonate ---------- 3 per cent
sodium phosphate ---------- 3 per cent
temperature ---------- 140 to 180 deg. F.

After the superficial surface dirt has been removed, aluminum parts which are to receive the zincate immersion treatment preparatory to plating are given an acid etch which removes a thin film of metal together with imbedded impurities. For wrought alloys, this is accomplished by means of an acid pickle which has the following recommended composition:

chromic acid ---------- 35 g./l. (4.7 oz./gal.)
sulfuric acid ---------- 176 g./l. (24 oz./gal.)
time ---------- 1 to 5 minutes
temperature ---------- 150 deg. F.
container ---------- steel, lined with carbon brick, lead, or suitable resistant material and provided with means for exhausting fumes

A mixed acid dip of the following composition is recommended for castings, particularly the aluminum—silicon alloys:

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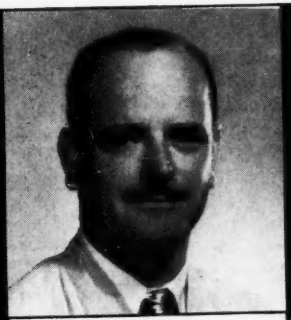

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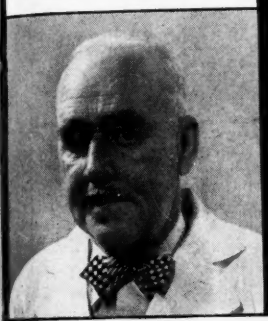

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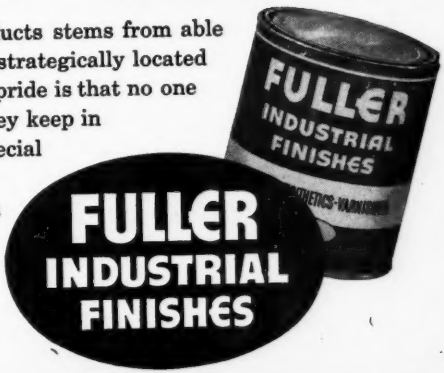

3 parts concentrated commercial nitric acid
1 part (48%) commercial hydrofluoric acid
time ——— 3 to 5 seconds
temperature ——— room
container ——— steel lined with carbon brick or other suitable corrosion resistant material, tank being fitted with suitable exhaust hood.

For acid treatment of the No. 13 die-casting alloy, containing 12 per cent silicon, a combination of the two treatments is recommended. A precautionary step is usually added to the production procedure which includes a dip in concentrated nitric acid after one or the other of the two acid etches. This may not be necessary unless the acid etch has become highly contaminated with copper and produces an immersion film of metallic copper on the aluminum surface. The point at which this occurs in the acid pickle will depend upon how well the free acid content of the solution is maintained.

These preceding steps serve to prepare the aluminum surface for the application of the zinc immersion layer, prior to introduction into the plating bath. While this immersion coating is the most important link in the entire procedure, if the preliminary treatments have been carefully carried out, there is nothing critical about application of the zinc immersion layer as a final step in the pretreatment process.

Hotpack Laboratory Apparatus. A 12-page illustrated catalog and price list describing various items of laboratory equipment has been issued by The Electric Hotpack Co., Inc., Cottman Ave. at Melrose St., Philadelphia 35, Pa. The catalog contains detailed descriptions of the operating characteristics of such items as high temperature ovens, drying ovens, electric furnaces, electric preheating ovens, electric constant temperature baths, and so on. Copy free upon request.

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PRACTICAL APPLICATIONS *of Modern Products*

Modern Zinc Plating Installation

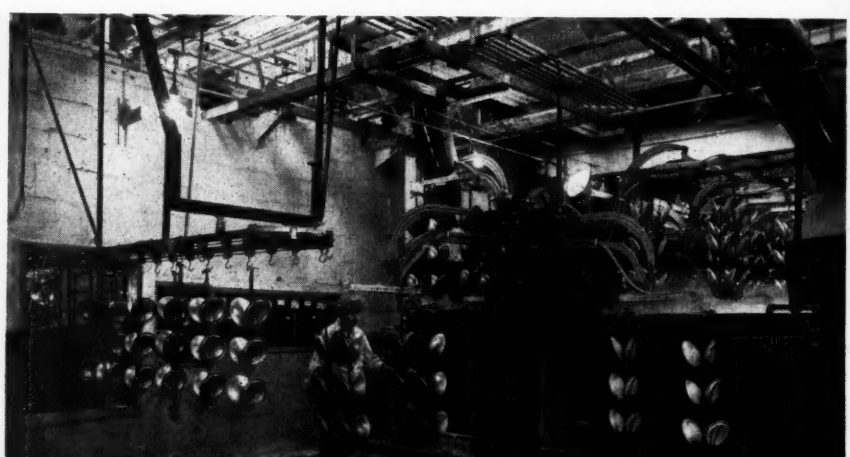
IN THE modernization of manufacturing methods and processes for the high production of complete hub caps at the Cleveland, Ohio plant of the Eaton Manufacturing Company, one of the major contributions to the program was the installation of a new Stevens full automatic zinc plating machine.

The Stevens Model "A" machine, which is illustrated, and also shown in the plan view drawing, was designed for the following treatment cycle:

1. Electric cleaner
2. Cold water rinse
3. Electrified acid dip
4. Cold water rinse
5. Cyanide dip
6. Zinc plating
7. Cold water rinse or reclaim
8. Cold water rinse
9. Cold water rinse and spray
10. Hot water
11. Load and unload

The steel hub cap inserts are zinc plated to a thickness of 0.00015 inch minimum to withstand approximately

Fig. 1—Shows operator easily loading double row carrier arms at working level position



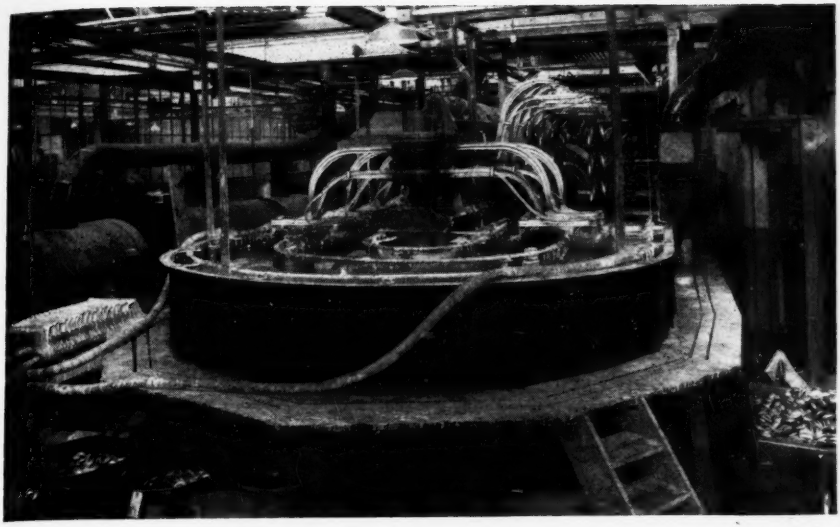


Fig. 2—Showing return bend of the plating tank, with carrier arms in plating position in zinc tank. Other carrier arms are at transfer position height.

50 hours of salt spray test, and the production per eight-hour shift is about 8,000 inserts.

The hub cap inserts are placed on the plating racks and carried to the zinc plating machine on a small continuous conveyor as shown in Fig. 1. After plating, they are carried to the final assembly point by the same means of transportation.

The automatic plating machine operates with an intermittent movement, providing for a fixed transfer time and a variable period of rest or dwell time, whereby the double row type carrier arm remains stationary at the loading and unloading point for a period of over 40 seconds. This permits one operator to easily load and unload the plating racks from the machine with a minimum of effort.

Each carrier arm handles 4 plating racks which are 39 inches long x 12 inches wide. Ample clearance is provided during the transfer time when the carrier arm is fully raised as shown in Fig. 2.

Special carrier arm construction was used on this machine. Current is picked up from the cathode track by heavy duty contact shoes, and is carried by ample cross arms on which the plating racks are suspended.

The machine, which is approximately 36 feet long, was shipped in two assembled sections, rolled into the plant and bolted together, then raised and set on the pedestal supports. The processing tanks were then placed on the pedestal, or machine supports, in their proper location. Finally, the external water, steam and electrical connections were made, completing the installation of the machine. Electric current for the zinc plating tank is consumed at the rate of 8,500 amperes at 6 volts. The electrocleaner tank requires 4,000 amperes at 6 volts.

Production and quality problems in the plating room have been reduced to a minimum as a result of the installation of this automatic machine.

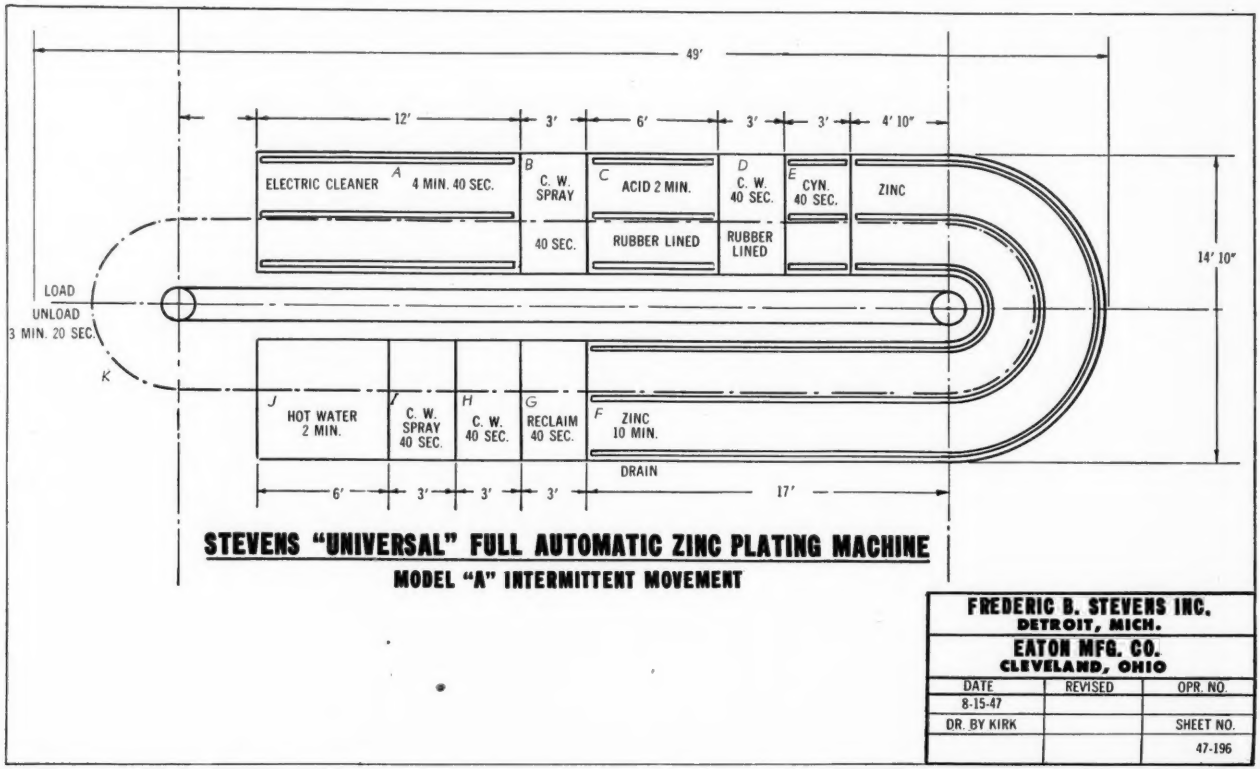
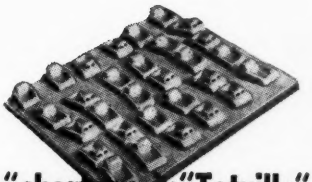


Fig. 3—Floor Plan of Plating Machine



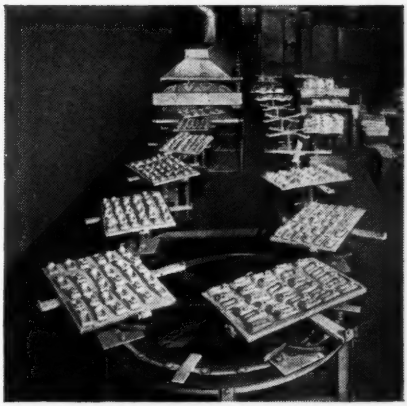
no "auto" shortage in "Totville" G-W infra-red doubles output

Production of the toddler's edition of the family car, "TOOTSIETOY," has been doubled by the manufacturer, DOWST MFG. COMPANY, since a G-W Infra-Red System replaced the gas-fired ovens.

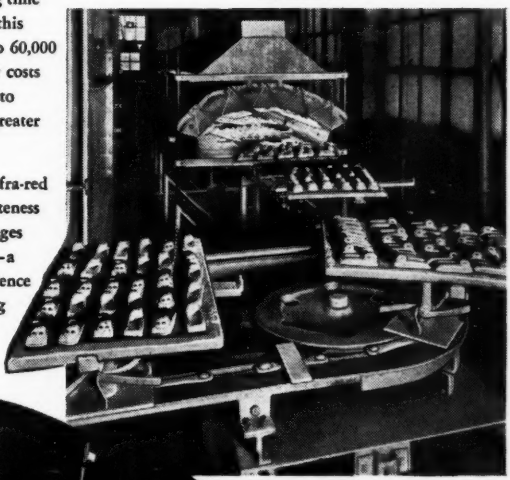
Cutting spraying, baking, drying and finishing time by 100% over previous handling operations, this G-W Infra-Red System now finishes 50,000 to 60,000 "Tootsietoy" auto bodies daily. Manual labor costs for placing toys on trays and transporting to spray booths have been reduced 50% by a greater use of conveyors in the G-W system.

Designed, built and installed by G-W, this infra-red system at the Dowst plant typifies the completeness of G-W service. Results emphasize the advantages of working with an organization like G-W—a pioneer in infra-red who utilizes the experience of over 130 years in designing and building materials handling equipment.

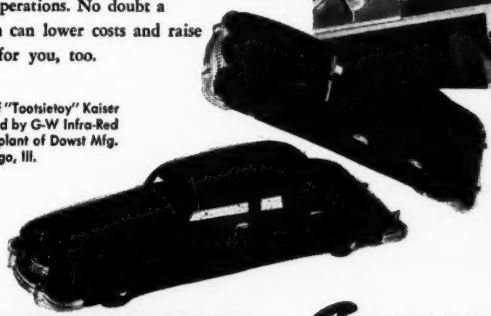
Ask a G-W engineer to study your metal processing operations. No doubt a G-W System can lower costs and raise production for you, too.



"Tootsietoy" Auto Bodies being Conveyed from Infra-Red Tunnel to Unloading Station.



G-W Turntable Loop Conveyor feeding "Tootsietoy" Cars from Spray Booth into 28 Ft. Baking Tunnel.



Close-up of "Tootsietoy" Kaiser Car finished by G-W Infra-Red System in plant of Dowst Mfg. Co., Chicago, Ill.

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Fig. 3—Floor Plan of Plating Machine

Conveyorized Galvanizing Process Installed at Rheem Plants

TO secure improved quality of product and reduced manufacturing costs, the Rheem Manufacturing Company has installed a completely mechanized process of hot dip galvanizing in its four plants. This development is a result of over 20 years of practical experience and research in the art of hot dip galvanizing. Steel hot water tanks for various applications are currently being galvanized by this production line process.

The new Rheem process requires that the tank be fabricated from two sub-assemblies; one consisting of the head and shell and one consisting of the bottom, or in the case of the gas water heater tank, a bottom and flue tube sub-assembly. Each sub-assembly is galvanized separately. The two sub-assemblies are then joined by the new Rheem bottom resistance welding method to form the final product.

In the first step of the operation sequence, the tank assembly is submerged in a bath of sulphuric acid which removes mill scale and prepares the steel surface for the subsequent protective zinc coating. In the new Rheem process, the time of immersion is regulated by the speed of the conveyor. The temperature of the solution is automatically controlled by thermostatic valves and the strength of the acid is under constant check. Figure 1 shows tanks being conveyed through the sulphuric acid pickling tank.

The tank sub-assembly is next transported on the overhead chain conveyor through a rinse chamber where a high pressure spray of water removes all foreign materials from the surface.

The tank sub-assembly is then submerged for a controlled period of time in a solution of hydrochloric acid. Automatic controls similar to those employed in the sulphuric acid tank are used to control this operation.

The conveyor then transports the tank sub-assembly to the entrance end

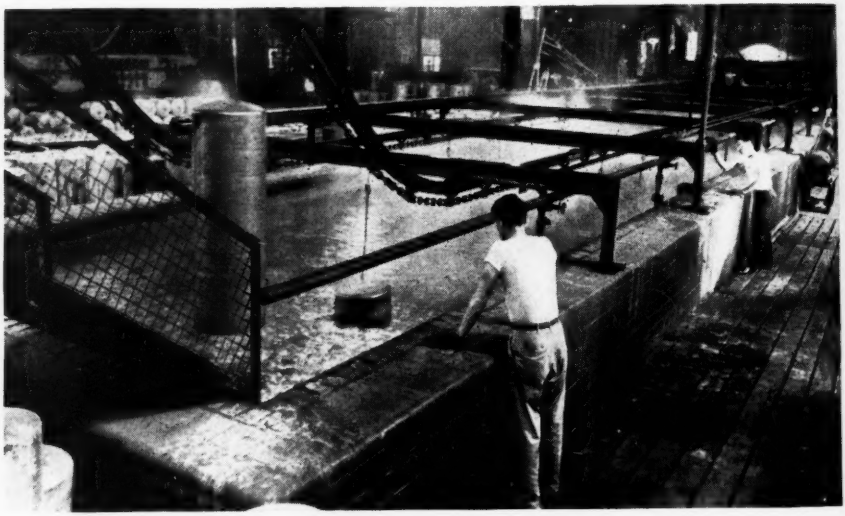

Fig. 1—Heater tanks dip automatically into the 80-foot sulphuric acid pickling tank.

New Type WHEEL BRUSH

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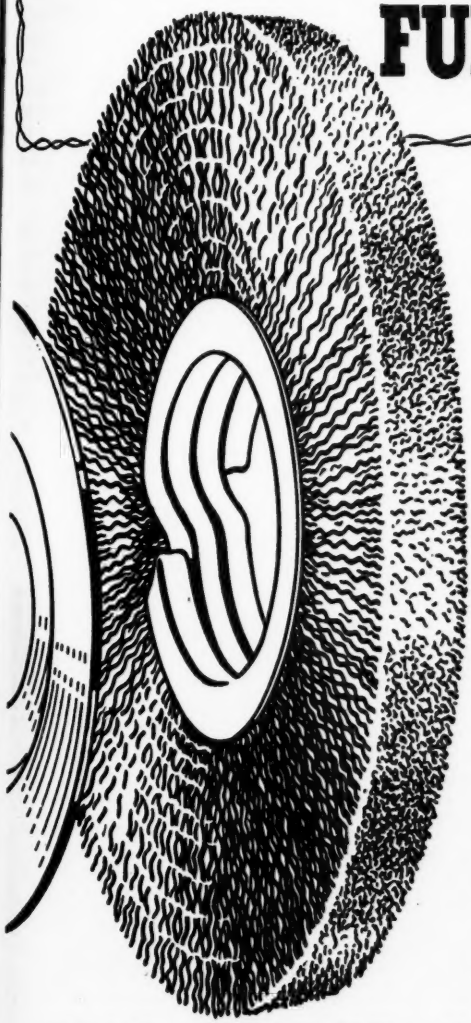

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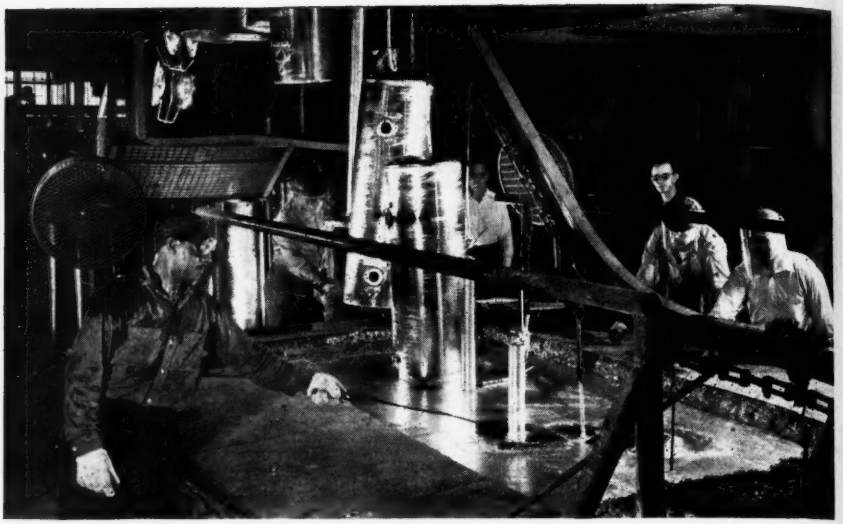

Fig. 2—Galvanized tanks are lifted by the chain conveyor from the hot dip galvanizing bath.

of the galvanizing kettle. At this point the sub-assembly passes through a blanket of flux floating on the surface of the molten zinc. This flux facilitates the final union between the molten zinc and steel of the tank. A head or shell sub-assembly will sink through the flux blanket into the molten zinc with minimum disturbance of the zinc bath. The sub-assembly is conveyed through the kettle, the conveyor speed controlling the time of immersion, and the upward pitch of the conveyor and conveyor speed determining the time of withdrawal. These two factors largely control the thickness and account for the uniformity of the zinc coating obtained on Rheem tanks. Figure 2 is a view showing galvanized tanks leaving the galvanizing kettle.

A tank sub-assembly is finally conveyed through a cooling chamber to an inspection station. Here the tank is examined inside and out for possible defects. Inspection is facilitated since the bottom of the tank has not yet been attached.

The tank sub-assembly is then removed from the conveyor and a galvanized bottom or galvanized bottom and flue tube sub-assembly (in the case of gas water heaters) is then welded in place by the previously mentioned bottom resistance welding method. The resistance welding method employed provides an excellent fusion of the bottom and steel shell and provides a leakproof joint with continuous refusion of the protective zinc coating. Figure 3 shows galvanized tank bottoms being welded to tank bodies.

A final hydrostatic test completes this portion of the work on the tank. At this point a water pressure considerably in excess of the designed service pressure is employed.

The original installation of the Rheem conveyorized galvanizing process was made at Sparrows Point, Maryland, where the major development and experimental work was performed. Subsequent similar installations have been made at Chicago, Illi-

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Concentrated Gold Plating Solution No. 319, containing one troy ounce of fine gold.

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Gold Coloring Solutions for Light Yellow, Red and Green Gold.

Let us send you our instruction booklet for these.

If you are contemplating new installations or changes in your present equipment, we may be able to help you with money saving suggestions. We shall be glad to have you consult us.

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nois; South Gate, California; and Birmingham, Alabama. The Rheem automatic galvanizing process is now employed in the plants mentioned for the manufacture of water heater tanks, range boilers, hydropneumatic tanks, expansion tanks, hot water storage tanks, and other miscellaneous tanks.

Spray Booth Maintenance. The DuBois Company has prepared a portfolio on the subject of paint spray booth maintenance. This presentation includes vital and important facts about keeping wet spray booths operating at maximum efficiency, plus interesting articles entitled "Operating Suggestions for Water Curtain Spray Booths," "Conditioning the Water for Wet Spray Booths," and "To Operate and Clean Wet Spray Booths." Also contained in the portfolio is a report prepared for a large automobile manufacturer, giving the correct operating procedure for spray booths.

The literature includes answers to such questions as: why chemical compounds are used in the water of wet spray booths, how much to use, how often to drain out all water and replace it with renewed charge, and how to know if the treated water is right. The complete portfolio can be obtained by writing to the Industrial Division, The DuBois Co., Cincinnati 3, Ohio.

Nickel Alloy Publications. The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., has issued revised List "A" of current publications on nickel alloy steels, nickel cast irons, nickel brass & bronzes, and nickel plating. Publications offered cover the production, fabrication, properties, and uses of nickel alloys for industrial applications, and the production, properties, and use of nickel electrodeposits. Copy free upon upon request.

Electrostatic Paint Spray Film. A technicolor sound 16 mm. film is announced by the Ransburg Electro-Coating Corp., 1234 Barth Ave., Indianapolis 7, Ind., covering its electrostatic detearing and spray finishing processes.

This film is available for showings by manufacturers, technical societies, educational groups, and so on, at no charge. It is 650 ft. long, and requires about 17 minutes running time.

A special sequence is devoted to showing how each process works, particularly the "wrap-around" feature of electrostatic spray. The major part of the film covers representative industrial installations, showing actual production line painting.

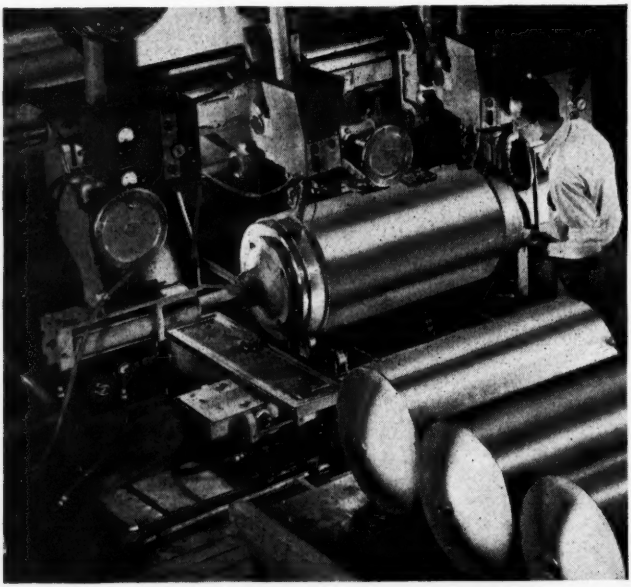


Fig. 3 — Galvanized tanks and bottoms are joined on the bottom welding machine by the Rheem resistance bottom welding method.

NEWS of the Industry

NEW PLANTS

THE QUAKER CHEMICAL PRODUCTS CORP., Conshohocken, Pa., in order to take care of expanding business, has recently let contracts for the erection of additional plant space.

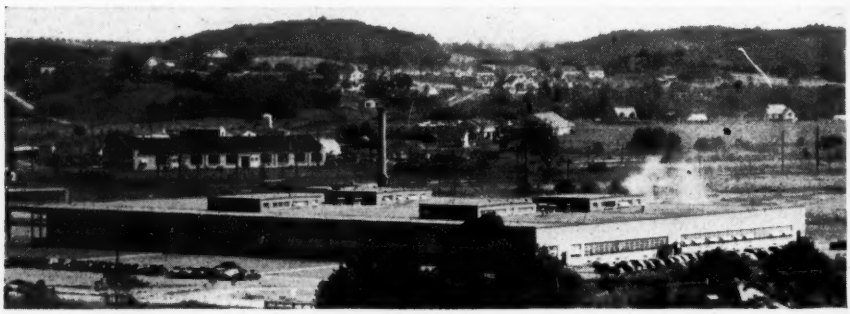
This addition will occupy ground recently acquired by the corporation and will cover approximately 20,000 square feet. The building is expected to be completed at the end of the year.

THE YALE & TOWNE MANUFACTURING COMPANY'S new flat-roofed Specialties Division lock plant at Salem, Virginia, utilizes an ingenious reversible heating and ventiliating system developed by The Austin Company, designers and builders of the plant, for effective year-round control of atmospheric conditions in structures not requiring full air conditioning.

The 127,000 square foot building, situated on a 24-acre site, was completed and production started within seven months after the first preliminary sketches were made. It houses operations previously conducted in a group of three to six-story buildings at Stamford, Connecticut, and is being devoted entirely to the manufacture of specialty locks for installation in automobiles, business machines, furniture, luggage, and in other manufactured products. Mark A. Miller is general manager and Charles E. Horne, plant superintendent.

GRANIUM PRODUCTS, 4427 Ledge Ave., North Hollywood, Calif., manufacturer of "Granium," an additive for silver and gold plating, is now housed in a new plant at Route 1, Saugus, Calif., 30 miles north of downtown Los Angeles.

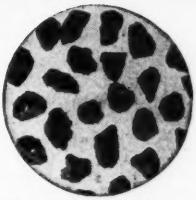
The new setup occupies a 40-acre tract at Honby Station. R. C. Hubbard, owner, has completed a modern laboratory building, 20 x 40 feet in dimension, in which check control of the products is handled. The plant is equipped with the most modern facilities as a reduction plant for Granium and other metallic alloys. Land, building, and equipment are said to represent an investment of $125,000.



View of the new flat-roofed Specialties Division lock plant of the Yale & Towne Manufacturing Company at Salem, Virginia

EXOLON IS THE ABRASIVE FOR *FAST METAL POLISHING*

ACCURATE GRADES... IRON PARTICLES REMOVED



Photomicrograph of Exolon RST Polishing Grains.

Exolon Aluminum Oxide Abrasives are available for polishing all types of metals.

The special production facilities at the new Exolon plant provide unsurpassed uniformity of grading (size and shape) in all standard sizes; assuring fast and satisfying polishing results.

Due to its greater freedom from magnetic particles, Exolon is a more efficient grain for polishing stainless metals...a safer material to use since ferrous materials will not become embedded in the surface. Write for Exolon's folder on polishing procedures and recommendations.

THE EXOLON COMPANY

943 E. NIAGARA ST. TONAWANDA, N. Y.

Manufacturers of SILICON CARBIDE and ALUMINUM OXIDE ABRASIVES

To house additional laboratories required for its ever-expanding research, **BATTELLE MEMORIAL INSTITUTE,** Columbus, Ohio, will begin construction of a new half-million dollar laboratory building late this year. The structure, according to Battelle Director Clyde Williams, is scheduled for completion in 1949.

This major addition to the Institute will be the largest of four laboratory structures erected by Battelle since World War II. It will be built of concrete and steel, with brick veneer finish, and will harmonize in architectural detail with other Institute buildings. The building will be located on Seventh Avenue, in Columbus, adjacent to the present Seventh Avenue Building.

The three-story structure will contain space for 103 unit laboratories, plus large open areas for pilot plant operations. It will contain approximately 80,000 square feet of space.

COMPANIES

THE ELECTRIC PRODUCTS CO., Cleveland 12, Ohio, recently appointed Hubert Kaub and Co., Denver, Colo., as direct factory representative covering the States of Colorado, Wyoming, Utah, New Mexico, and El Paso County of Texas.

The principals of this concern are Hubert Kaub and his son George, fourth and fifth generation natives of Denver and well-versed in selling specialty electrical equipment. They will handle The Electric Products Company line of industrial motive-power and hand-lift truck battery chargers, electrolytic motor-generators, synchronous motors, mine locomotive battery chargers, telephone exchange battery chargers, central station stand-by charging equipment, frequency changers, and industrial dynamometers.

Previously designated as "Stylon" Micro-Cut Fibers, the precision cut flock products will hereafter be designated as "Behrlon" Micro-Cut Fibers, according to an announcement by **BEHR-MANNING CORP.,** Troy, New York.

Simultaneous with the new name change which is now being registered, Behr-Manning announces improvements in its dyeing techniques and the addition of six new standard colors.

A survey of manufacturing facilities and markets on the Pacific Coast was made recently by R. A. Emmett, president, and A. O. Thalacker, vice president and general manager of the **DETREX CORP.,** Detroit 32, Mich. Among other problems studied was that of improving service to customers of Detrex cleaning equipment and chemicals.

Being also officers of Hooker-Detrex Incorporated, they visited the solvent manufacturing plant located in Tacoma, Washington.

THE MONROE SANDER CORP., Long Island City, N. Y., manufacturer of industrial finishes, has anounced that it will distribute new complete lines of automotive, industrial, and trade sales paints, varnishes, lacquers, and enamels. These products, bearing the firm's trade name, Sanco, will be handled by paint distributors and dealers, Dudley B. Blake, vice president in charge of sales, stated.

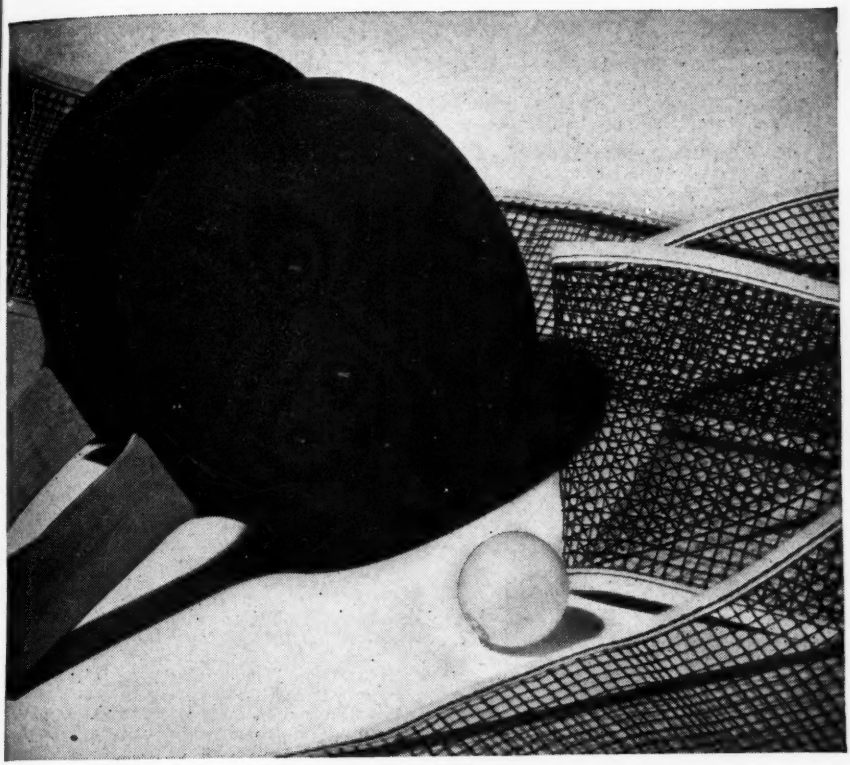
The automotive line is said to feature a full range of lacquers for automobile paint shops, as well as synthetic enamels and primer surfacers for fleet owners and truck maintenance use. The industrial line consists of clear and pigmented lacquers for all types of wood and metal products. Also available are sealers, retarders, and thinners.

THE C. M. HALL LAMP CO., Detroit, Mich., a pioneer in the development of electric infra-red heating, has sold its Radiant Heat Division to the Triangle Equipment Co., Nutley, N. J. This move was necessitated by the expansion of Hall's automotive lighting production.

The nation-wide sales organization of the Radiant Heat Division is being taken over by Triangle who contemplates no change in sales or service policies. C. S. Cogger, manager, Radiant Heat Division, and F. T. Thayer, engineer, are leaving the C. M. Hall Lamp Company to join the Triangle Equipment Company in its expansion program.

C. E. Johnson & Associates, 404 Bona Allen Bldg., Atlanta, Ga., have been appointed sales agents for the industrial filtration products manufactured by the **U. S. HOFFMAN MACHINERY CORP.,** Syracuse, New York.

The Johnson organization will have



BRIEFLY, BEHRLON FINISHES *SELL!*

Whatever you make, wherever you sell it, ask yourself this question — "Would my product *look better, serve better, sell better* with a soft, velvet-like Behrlon finish?

If your answer is "yes," "*maybe*," or "*don't know*," it will pay you to let us try a Behrlon finish on four or five of your samples. We'll work out the proper Behrlon coating application, make recommendations, and return the finished samples promptly for your approval.

It's a sure, easy way to see if your product can take on new beauty and sales appeal. Write us about this test now. New color swatch card on request.

BEHR-MANNING

BEHR-MANNING

TROY, N. Y.

76 YEARS OF QUALITY SERVICE

representation for the Hoffman line of coolant clarification equipment in Alabama, Georgia, Florida, and eastern Tennessee.

THE GENERAL CERAMICS AND STEATITE CORP., Keasbey, N. J., has announced the appointment of D. D. Foster Company of Pittsburgh as its representative for western Pennsylvania, Ohio, and West Virginia.

The D. D. Foster Company, an organization of sales engineers in the field of equipment for the petroleum-chemical industry, is now prepared to offer equipment fabricated of chemical porcelain, chemical stoneware, and impervious graphite.

HONORS

At a recent gathering of the department heads of the Clover Manufacturing Co., Norwalk, Conn., **GEORGE A. FISH**, sales manager, was honored in celebration of his 30 years of continuous service with the company. Paying tribute to Mr. Fish, Mr. Gallaher, president, referred to the fact that during his many years of active service, Mr. Fish has traveled in every state of the union as well as being in charge of Clover's San Francisco and Chicago offices for long periods of time. Mr. Gallaher also mentioned that Clover is particularly proud of the high esteem in which Mr. Fish is held throughout the coated abrasive industry.

NEW POSITIONS

Frederic B. Stevens, Inc., Detroit 16, Mich., announces the appointment of **GEORGE A. MEYERS** as sales representative in the Metropolitan area. Mr. Meyers is a bona-fide native Detroiter, having been born and reared in the Motor City.

He was formerly purchasing agent for a well-known screw machine products company, but entered the selling field in 1933, being engaged principally in the selling of metal finishing products.

He joins the Stevens organization with a background well suited to the selling and servicing of the company's line of buffs and buffing compositions, in which he will specialize.

The Egyptian Lacquer Manufacturing Company has announced the following appointments and revisions in key personnel: **ALEXANDER JAMES LAPOINTE** has been appointed chief chemist. The sales division acquires **FREDERICK J. BURNETT** as technical sales manager.

PHILIP H. BEACH has been moved to West Hartford, Connecticut, where he will serve as division sales manager supervising sales operations in the entire New England area. In the same capacity **JOHN BERTIL DE BRUN** will superintend the sales division covering Metropolitan New York and New Jersey.

G. M. HOWARD has been appointed sales manager of the Food Processing Equipment Division, Detrex Corp., Detroit 32, Mich., according to an announcement by A. O. Thalacker, vice president and general manager. The formation of the new division extends the corporation's 28 years of service to the industrial and institutional cleaning fields, and the dry-cleaning industry. Cleaning equipment, chemicals, and process machines for the food industries are also being manufactured and marketed.

Mr. Howard, a mechanical engineer, brings to this division over 35 years of experience in manufacturing and sales. Over half of this experience has been in the design, manufacture, and sale of cleaning equipment and chemicals. For the past 10 years, Mr. Howard has been president of The Howard Engineering and Manufacturing Co., Cincinnati, Ohio.

Appointment of **E. P. CAMOUS** as traffic manager of W. P. Fuller & Co., 301 Mission St., San Francisco 19, Calif., has been announced by President A. H. Brawner. Mr. Camous succeeds former traffic manager N. B. Wagner, who retired recently after completing 50 years of service with the firm.

Mr. Camous graduated from the University of San Francisco in 1939 with the degree of B.S. in economics, and later completed the three-year course of the Traffic School of Golden Gate College.

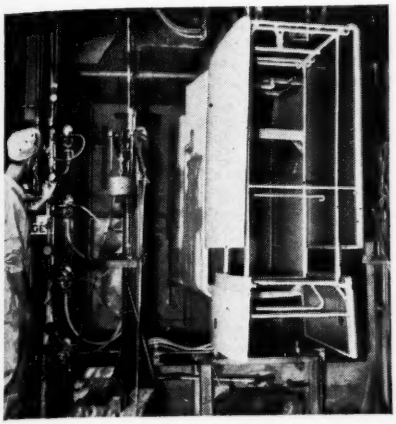
During the war years, Mr. Camous served as administrative assistant to the Officer in Charge, Commercial Communications Section, Signal Office, Ninth Service Command. Since 1945 he had been assistant traffic manager of W. P. Fuller Company under Mr. Wagner.

MODERNIZE WITH ELECTRO-SPRAY

ON REFRIGERATOR CABINETS, Electro-Spray increased production 45% in less floor space—will save over $100,000 annually on just one coat.

RANSBURG

ON TRUCK SIGNAL FLARES, Electro-Spray competes with former dipping operation in paint mileage, increases production 50% with same labor.



Large product or Small
you'll save 40 to 60 percent

Operating records on product after product—large and small, even articles which never before could be painted automatically—prove that it pays to modernize with Ransburg Electro-Spray.

By letting electrostatic forces do the work, Electro-Spray saves 40 to 60 per cent on paint alone . . . usually reduces spray stations to just one booth, manned by one attendant . . . and holds rejects to a fraction of other methods.

Ransburg engineers are ready to help you investigate the advantages of Electro-Spray as applied to your particular painting operation.

RANSBURG

RANSBURG ELECTRO-COATING CORP.
Indianapolis 7, Indiana

S. A. Crosby, president of Sterling Tool Products Co., 1340 N. Milwaukee Ave., Chicago, Ill., manufacturer of portable sanding machines, has announced the promotion of **D. A. HUTCHISON** to the position of general sales manager, succeeding J. A. Proven who resigned.

H. P. GANGWER, comptroller, has been named company vice president.

JOHN H. CIOE has joined V. J. Dolan & Co., 1830 N. Laramie Ave., Chicago 39, Ill., as a technical service representative in Chicago and the adjoining territory. Mr. Cioe received his technical training at the Royal Technical School, Rome, Italy, and has been employed in U. S. finishing plants for 20 years.

Appointment of **RICHARD T. UBBEN** as technical director and **ELMER H. KOLL** as assistant technical director of Pittsburgh Plate Glass Company's Milwaukee Paint Division has been announced by Dr. W. W. Bauer, technical director of the firm's paint operations.

Mr. Ubben, who succeeds Dr. Bauer in the Milwaukee position, has been associated with the paint industry since his graduation from the University of Illinois in 1929.

He had been associated in technical capacities with the Du Pont Experimental Station, Forbes Varnish Company, and Armstrong Paint and Varnish Company prior to joining Pittsburgh Plate's Newark Paint Division as technical director in 1942.

Mr. Koll joined the Milwaukee Paint Division upon graduation in 1928 from the University of Wisconsin. As assistant technical director, he will continue to supervise the industrial development and service work which he has handled during the past seven years.

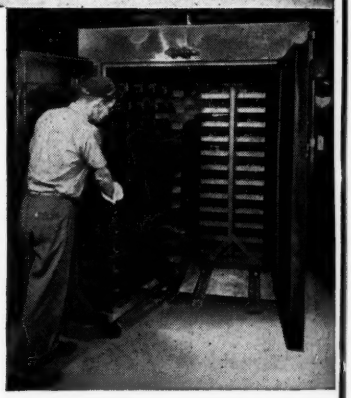
MORRIS G. GARDNER has been appointed technical director of the Newark, New Jersey paint division of Pittsburgh Plate Glass Company. Mr. Gardner succeeds R. T. Ubben.

Associated in technical capacities with the paint industry for 30 years, Mr. Gardner joined Pittsburgh Plate's Newark Division in 1935 to supervise technical development and sales work on lithographic and container coatings.

Also announced is the promotion of **R. S. HARTZELL** to the position of assis-

FAST FINISH BAKING

Refinished Relay Covers and other Control Parts Formerly Air Dried in 8 Hours—Now a Better Wrinkle Finish is Baked in ONE HOUR with the



Despatch R. S. FINISH BAKING OVENS

Minneapolis-Honeywell Regulator Co. uses the above Despatch R S Oven for refinishing of controls sent in for repair. The black wrinkle enamel on the relay cover shown is baked to an extremely hard, durable finish in 1 hour at 300° F. saving 7 hours of former air drying time! Other parts are baked ½ hour at 350° F. This fast baking of finishes speeds up the entire repair program, improves service to customers.

Despatch R S Ovens are well insulated, very economical, 100% controlled for uniform heat up to 500° F., with temperature variation seldom more than 3° ± F. Built in a range of sizes for a great variety of applications. Tell us your needs—

DESPATCH OVEN CO. Established in 1902

Write us for literature

Manufacturers of ovens for: Paint Finishing, Dehydrating, Curing, All Industrial and Laboratory Applications.

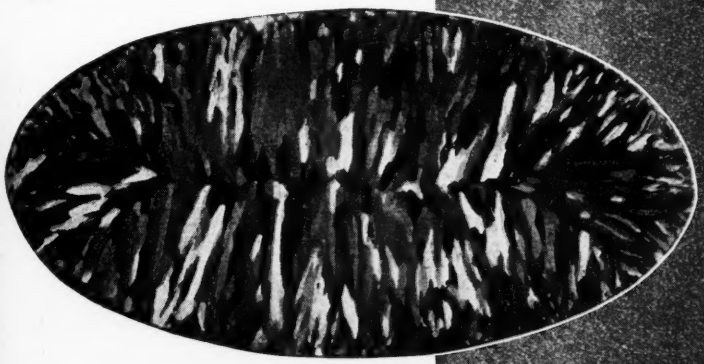
327 DESPATCH BLDG., MINNEAPOLIS 14, MINN.

SEYMOUR

Seycast

NICKEL ANODES

***"Seycast"*—An improved type of 99%+ cast anode of very high efficiency designed primarily for Bright Nickel baths, but works perfectly in any hot Watts bath having a pH of 4.5 electrometric or lower. Corrodes evenly with practically no loose nickel formation, due to long, interlocking grains radiating from a common center. Especially suitable for high current densities.**



Also

STANDARD AND SPECIAL SHAPES

99% + Rolled Depolarized
99% + Cast Oxide Depolarized
99% + Rolled Carbon
99% + Cast Carbon

THE SEYMOUR MFG. CO.
Seymour, Conn.

tant technical director. Mr. Hartzell has been engaged in lacquer development and field service work with the Newark operation during the past 11 years.

DAN MANDERY has been named to head the Platecoil Division of the Kold-Hold Manufacturing Co., Lansing, Mich. A veteran in his field, Mr. Mandery brings to the Platecoil Division an enviable record in sales and service.

Mr. Mandery will give all his attention and ability to Platecoil, a medium of heat transfer, and a recent development of the Kold-Hold Manufacturing Company.

D. J. ERIKSON, who started his career with the Hagan Corporation as a draftsman more than three decades ago, has been elected president of Hagan and its subsidiary companies, Calgon, Inc., Hall Laboratories, Inc., and Buromin Company.

He succeeds J. M. Hopwood, president of Hagan Corporation since 1918—the only man to pre-date Mr. Erikson in point of service with the company. Mr. Hopwood was elected to the new position of chairman of the board of directors of the Hagan group.

WALTER L. SHEPPARD, JR., formerly advertising manager of The Atlas Mineral Products Co., Mertztown, Pa., is now associated with Tanks & Linings, Ltd., Town Wharf, Droitwich, Worcestershire, England, as technical advisor.

Merit Products, Inc., 4373 Melrose Ave., Los Angeles 27, Calif., maker of Sand-O-Flex sanding wheels and abrasive cartridges, has announced the appointment of **F. W. ANDERSON,** 800 N. Clark St., Chicago, Ill., as sole sales representative for the Illinois and Wisconsin territory. With offices in Chicago and Racine, Mr. Anderson plans to install practical facilities for demonstrating the Sand-O-Flex line of wood and metal finishing tools.

FOREST E. ALLEN, formerly a member of the faculty of Iowa State College, Department of Mechanical Engineering, and associate professor of metallurgy, has joined the Development and Research Division of The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., it was announced by T. H. Wickenden, vice president in charge of that division.

He will make his headquarters at New York and will work on the company's educational program with universities and colleges in the United States.

E. R. Broden, vice president of The Carborundum Co., Niagara Falls, N. Y., announces the following personnel changes effective immediately: **E. B. FORSE,** former manager of the Refractories Division at Perth Amboy, has been appointed assistant vice president.

C. E. HAWKE, formerly director of sales, has become manager of the Refractories Division with full responsibility for the direction of this divison's sales and manufacturing.

E. R. BAXTER has been appointed director of sales and sales administration to succeed C. E. Hawke. **G. R. RAYNER, JR.,** has become assistant director of sales administration under Mr. Baxter.

Want to Color Copper?

McKeons "Liquid Sulphur"

is

"The Oxidizing Agent of Today"

Simple, Easy to Use.

TRY

SULPHUR PRODUCTS CO.

GREENSBURG 6, PA.

is your problem **black** *or* white **?**

here is your answer . . .

• Through the Watson-Standard continuous program of "Quality through Research" we have developed a wide range of black and white coatings which cover the field of service coatings, ranging from ordinary type to highly technical product finishes.

These finishes may be custom-formulated or stock items which meet all requirements for brilliance or dullness, air dry or baking, roller-coating or spray, dip or brush, and **are available in synthetic, oleoresinous, alkyds or vinyls.**

Write us about your individual problem.

TOUGH JOB HEADQUARTERS
Prescription Finishes
Give us your coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

THE WATSON-STANDARD CO.
Manufacturers of
PAINTS • VARNISHES • INDUSTRIAL FINISHES AND LITHOGRAPH COATINGS

FACTORY AND GENERAL OFFICES: PITTSBURGH, PA.
WAREHOUSES: BOSTON, BUFFALO, DETROIT, NEW YORK

Theodore F. Onkey, president of the Roberts Rouge Co., Stratford, Conn., announces the appointment of **RAYMOND HUGHES** as general superintendent of the company. Mr. Hughes, who enjoys an enviable record in the finishing field for developing and producing buffing compounds and rouges, was previously associated with the Lea Manufacturing Company for 13 years.

Appointment of **DAVID M. GANS** as director of research of The Arco Company, manufacturer of automotive, industrial, and other special coatings, has been announced by Howard E. Wise, president.

Dr. Gans, a graduate of the University of Chicago where he received his Ph.D in colloid chemistry in 1929, comes to Arco from the Quaker Chemical Products Corp., Conshohocken, Pennsylvania.

GEORGE W. ULLMAN was elected president of Sun Chemical Corporation at a special meeting of the board of directors held on September 24, 1948. **A. C. HORN** was elected chairman of Sun's executive committee. **WILLIAM RECHT,** vice president, was elected as a member of the board of directors.

A. E. HORN, president of the A. C. Horn Company Division of Sun Chemical, and **ERNEST NATHAN,** president of Warwick Chemical Company Division of Sun, were elected vice presidents of the corporation.

ALBIN K. SCHOEPF retired and **JAMES W. RAYNOLDS** resigned.

SOCIETIES

A project honoring the memory of the late Dr. J. J. Mattiello has been inaugurated by **THE NEW YORK PAINT AND VARNISH PRODUCTION CLUB.** The club has planned to establish at the Polytechnic Institute of Brooklyn a book collection to be properly identified by a plaque and to be known as the Mattiello Memorial Collection. The club invites individuals, companies, or associations engaged in or associated with paint and varnish production to make contributions of books pertaining to paint and varnish technology and funds which will be used to purchase additional volumes.

The facilities provided through this memorial will be not only a permanent tribute to Dr. Mattiello but a very useful library for the members of the paint, varnish, lacquer, and allied industries. Communications regarding contributions of books or funds should be sent to Mattiello Memorial Committee, c/o The New York Paint and Varnish Production Club, 360 Furman St., Brooklyn 2, New York.

The first annual banquet scheduled in eight years by the **PHILADELPHIA BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** was held Saturday, November 6, at the Broadwood Hotel.

Speakers included: Dr. William Blum, National Bureau of Standards, whose talk outlined activities of the Government in Electroplating; Dr. Walter R. Meyer, president of Enthone, Inc., who spoke on the preparation of metals for electroplating; and talks by Myron B. Diggin, technical director of Hanson-Van Winkle-Munning Company, and William M. Phillips of the General Motors Corporation Research Laboratories.

THE NATIONAL ASSOCIATION OF FOREMEN reports a record attendance at the Silver Jubilee Convention held in Philadelphia, September 23-25. In attendance were some 10,000 delegates from supervisors' clubs, representing approximately 40,000 members in more than 1,000 plants located in 36 states.

The NAF is an organization of supervisors from all levels of management from president down to line foremen. Its chief purpose is to weld all phases of supervision into a hard-hitting management team which will maintain the American way of life. Its philosophy attempts to show supervisors that they have a stake in the success of the companies for which they work and should take pride in developing supervision as a profession.

The Research Committee of the **AMERICAN ELECTROPLATERS' SOCIETY** has announced the establishment of a second fellowship at Princeton University to intensify the study of the nature and effects of porosity in electrodeposits.

Dr. Nathaniel Thon, who is the project director, has been very fortunate in obtaining the services of Dr. L. Yang as research associate.

CLAREMONT Flock

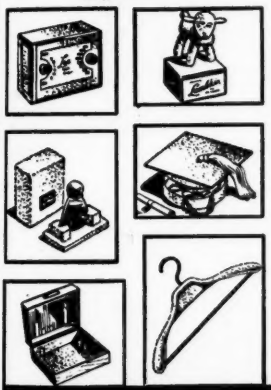
COTTON · RAYON · WOOL

Exciting Sales Stimulant for Product, Package and Display!

Claremont Flock is unexcelled in the art of make-believe. Rich, deep-tufted surfaces economically bespeak luxury. Serve both decoratively and functionally. In addition to industry's use of Claremont Flock on boxboard and papers, it is also applicable to almost any adhesive-prepared surface. At minimum cost, the results insure maximum allure. Servicing industries already number many conveniently located experienced handlers and ingenious processors. These well-equipped sources are fully qualified to counsel with you. We, at Claremont, will be very happy, upon request, to furnish complete details, color cards, flock samples and prices. Inquiries invited!

"An Ounce of Flock Adds a Pound of Allure"

18 BRILLIANT SHADES
•
Various Length Fibres
•
St'd Lgth 1/16"



Decoratively Fascinating . . .

Industrially Proven . . .

Flock can be easily applied by either the air nozzle, silk screen or dip processes on glass, wood, paper, metal, fabric or plastic . . . of any shape or size. Speaker grilles, turn-tables, toys, velour and suede papers, greeting cards, banners, signs, displays, packaging and the fashion field have achieved unusual effects with Claremont Flock. Produces the feel and appearance of rich fabrics, suedes and velvets.

For finishing, coating, insulating, sound-dealing, shock-absorption, bolstering, etc., Claremont Flock is proving not only more workable—but more economical. Its instant availability makes it most desirable for general industrial purposes.

CLAREMONT WASTE MFG. CO.

CLAREMONT, NEW HAMPSHIRE

The members of the Project Directing Sub-Committee associated with this project are Dr. W. A. Wesley, chairman, International Nickel Company; A. Mendizza, Bell Telephone Laboratories; and Dr. B. Egeberg, International Silver Company.

A Joseph J. Mattiello lecture has been instituted by the **FEDERATION OF PAINT & VARNISH PRODUCTION CLUBS** for presentation at the annual meeting. Subject matter for the lecture will consist of discussions of outstanding developments in chemistry, engineering, and other fields of science which may bear upon the manufacture and use of paints, varnishes, lacquers, and related protective coatings This lecture commemorates the name of Joseph J. Mattiello who, as a member of the Federation, did so much to expand the application of science to the protective coatings field.

The president of the Federation will appoint annually a committee to be known as the Joseph J. Mattiello Lecture Committee to select the lecturer for the annual meeting in the following year. The committee will select a man who has made outstanding contributions to science to present a paper on a phase of chemistry, engineering, or other science fundamental to paint, varnish, lacquer, or related protective and decorative coatings.

The lecture will be published in the Official Digest. A list of the lectures showing the names of the lecturers and titles of the lectures will be published in the Year Book.

The first Mattiello Lecture will be given at the 1949 annual meeting of the Federation.

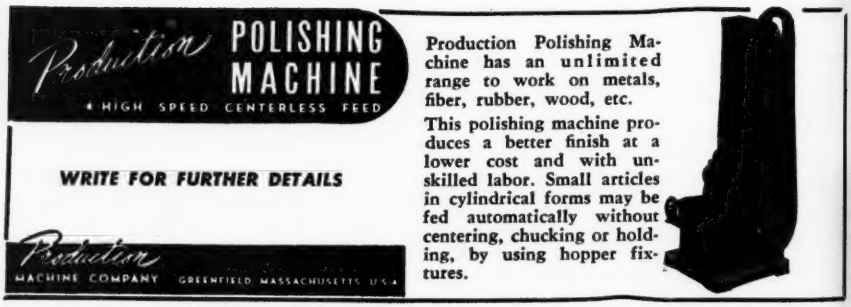
Establishment of the lecture was initiated through the New York Paint and Varnish Production Club. The recommendations were presented to the Executive Committee of the Federation at the September meeting by Robert D. Bonney of the New York Club.

BERKS REFINING
Company
Save money on your degreasing solvents by having BERKS REFINING COMPANY rerefine your used solvents. No shipping problem for you. We pick up your used solvents and return them to you. Ask for price.
Write P. O. Box 52, Pottstown, Pa.
Phone: Birdsboro 2-2956.

TRAINING COURSES

JOSEPH B. KUSHNER, metal finishing consultant, announces the inauguration of a correspondence course for electroplaters called "Electroplating Know-How." The course, which will be conducted personally by mail by Mr. Kushner, is designed to provide practical platers a solid background in the basic fundamentals of plating so that they can perform plating operations from a modern and scientific point of view and advance themselves in their work. Along with the "know-how" of plating, the course gives the "why-how" that enables a man to "think" plating in simple, easy-to-understand language.

Further information regarding the course may be obtained by writing to Mr. Kushner at Stroudsburg, Pennsylvania.

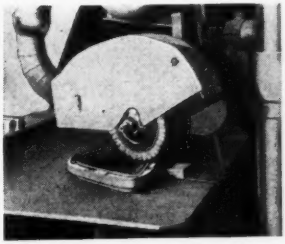

Production POLISHING MACHINE
HIGH SPEED CENTERLESS FEED
WRITE FOR FURTHER DETAILS
Production
MACHINE COMPANY GREENFIELD MASSACHUSETTS U.S.A.
Production Polishing Machine has an unlimited range to work on metals, fiber, rubber, wood, etc.
This polishing machine produces a better finish at a lower cost and with unskilled labor. Small articles in cylindrical forms may be fed automatically without centering, chucking or holding, by using hopper fixtures.

• FOR HIGH PRODUCTION POLISHING AND BUFFING •

ROTARY AUTOMATICS • SEMI-AUTOMATICS • STRAIGHT LINE AUTOMATICS

ACME *Reveal Moulding* POLISHING AND BUFFING MACHINE

Another ACME unit that cuts polishing and buffing costs!



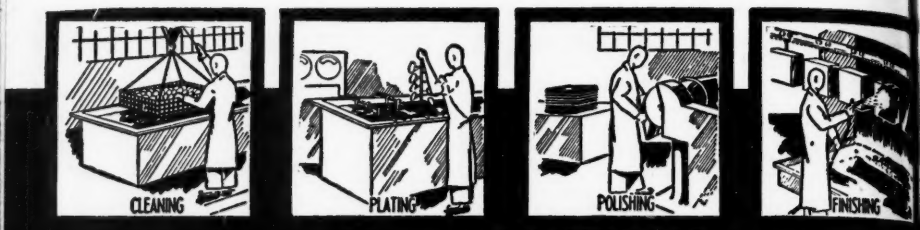
The ACME Reveal Moulding Polishing and Buffing Machine is a versatile basic unit adaptable to a variety of production jobs. It handles well and tree platters, automotive reveal mouldings and other odd shapes difficult or dangerous to polish by other methods. It is also used to remove draw marks from stampings such as refrigerator doors and similar type parts. This machine can be furnished with individual type ACME adjustable floating head buffing lathes used in conjunction with separate fabricated tables incorporating roller feed unit to handle larger parts.

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

1645 HOWARD ST. DETROIT 16, MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS



New • EQUIPMENT • MATERIALS • PROCESSES

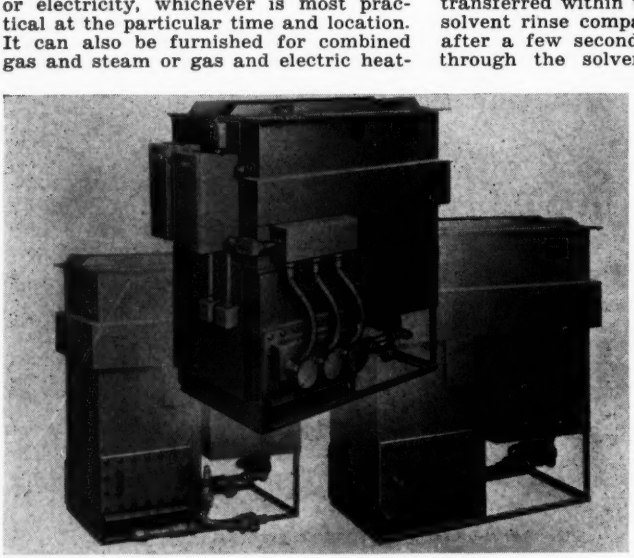
Detrex "625" Degreaser

Announcement of the new "625" Degreaser, a two-dip hand-operated unit designed for rapid, safe, and thorough cleaning of medium size metal parts of all kinds in machine shops, production, assembly, and maintenance departments, has been made by the Detrex Corp., Industrial Division, Box 501, Detroit 32, Michigan.

The unit can be heated by steam, gas, or electricity, whichever is most practical at the particular time and location. It can also be furnished for combined gas and steam or gas and electric heating. An important feature of the design of the equipment is the standardization of main body construction so that the unit can be quickly converted from one type of heating to another where seasonal changes in heating method give added economy or conversion.

The Detrex 625 Degreaser employs the immersion-solvent-vapor degreasing process used to remove grease, oil, and similar materials. To operate, the parts are simply lowered into boiling solvent, transferred within the machine to a cool solvent rinse compartment, from which, after a few seconds, they are removed through the solvent vapor zone. The Perm-A-Clor solvent used is nonflammable and cannot explode.

The degreaser is of all-welded construction, fabricated from 10-gauge steel plate and reinforced with structural steel. All interior surfaces are protected with a molten zinc coating which is



Immersion - solvent - vapor degreaser with standardized body construction to facilitate interchange of heating means. Machine at left is steam-heated; center, electric-heated; and right, gas-heated.

sprayed on after fabrication. It is also available built of life-time corrosion-resistant nickel-steel. There are no moving parts to wear or get out of adjustment, cleaning costs are very low, and further economy is provided by the quick change of heating method, if required.

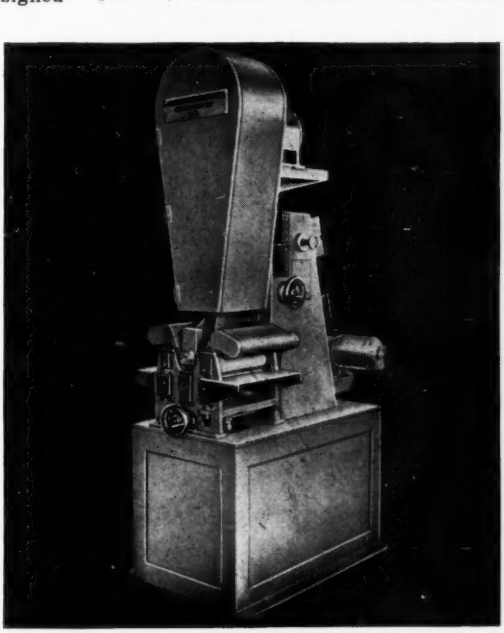
Production capacity is conservatively rated at 1,000 pounds of steel parts per hour. This unit will immersion-clean parts that will go into a space 18 x 21 x 12 inches deep, and shafts up to 4 feet in length can be cleaned by suspending them in the vapor zone. Floor space occupied is about 10 square feet, and the net weight is approximately 500 pounds.

Curtis Straight-O-Matic Model 600 Polisher

Product of the Curtis Machine Corporation and distributed by W. J. Holtmeier, Inc., 71 W. 23rd St., New York 10, N. Y., the Curtis Straight-O-Matic Model 600 Polisher, here illustrated, was designed for the automatic abrasive belt finishing of flat stock in widths up to 10 inches.

The polishing machine is so designed that it can be used as an individual machine, changing belts for the various grits to be used; in tandem; or with an inverted head so that both top and bottom can be finished in one pass of the stock. The polisher can be used also in connection with automatic buffing heads so that a complete finishing operation may be performed.

Three rigidly-built sub-assemblies, base, sanding unit, and feed mechanism, comprise the Model 600 Polisher. The abrasive belt drive motor, belt tension, and micrometer tracking ing devices are said to be conveniently arranged for quick belt changing and alignment. Feeding may be manual, by coil unwinding and winding machines, or by conveyor. The rate of feed may vary from 20 to 60 feet per minute. Either a 3, 5, or 7½ h.p. 1,200 r.p.m. a.c. motor can be furnished to drive the sanding belt. Necessary accessories for wet grinding can be supplied if required.



Curtis Straight-O-Matic Model 600 Polisher

Magnus Stripit

The Magnus Chemical Co., Inc., Dept.. PF, Garwood, N. J., has announced the development of Magnus Stripit, an improved material for removing paint, lacquer, primer, synthetic enamel, baked and air-dried varnish, and baked automotive finish. Stripit is a heavy-bodied liquid which clings to vertical or inverted surfaces. It is slow to evaporate and can be left on surfaces for longer periods of time without becoming set or hard to rinse off.

Stripit is said to be able to remove at least three coats of paint in one application. The first coat begins to pucker in one to five minutes. Ordinarily the action of Stripit is so thorough that a cutting stream of water directed on the surface will remove all the loosened paint in a few minutes.

According to the manufacturer, Stripit is always ready to use and does not require the addition of acids or thickeners,

mixing, stirring, or other handling. It is non-inflammable, and does not require the use of inflammable solvents. Surfaces stripped are ready for refinishing without neutralizing. It is safe to use on any metal or wood, and will not bleach or raise the grain of wood.

"Jet Blast" Metal Cleaning and Finishing Machine

Armstrong Chemical and Machine Co., Painesville, Ohio, announces the new "Jet Blast" machine for wet abrasive blast cleaning and finishing of metal surfaces.

The Jet Blast method is said to remove rust, scale, and undesirable metal particles, such as feather edges on sharpened tools, by projecting a slurry of fine abrasive suspended in water against the surface to be cleaned. The large permissible variation in abrasive size (60 to 1,250 mesh) makes it commercially possible to produce finishes as low as 2-3 micro-inches r.m.s., it is claimed.

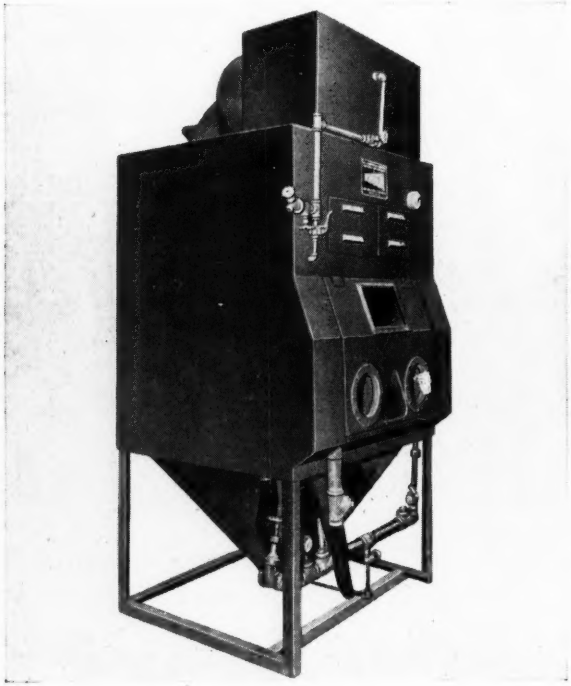
Specifications of standard models are: (1) cabinet, 30 x 30 x 77 inches high; one blast nozzle and exhaust blower direct connected to ¼ h.p. motor; (2) cabinet, 48 x 42 x 108 inches high; one to eight blast nozzles and exhaust blower direct connected to 1 h.p. motor. Cabinet and frame are of watertight welded steel construction. The siphon jet principle is used for transferring the grit slurry, thus eliminating contact between pumps or moving parts and the abrasive liquid. Each machine is a self-contained unit, completely fitted for connection to air lines.

Typical applications for the Jet Blast cleaning machine are: removal of rust, mill scale and heat treating scale; cleaning forging dies and metal molds; honing metal cutting tools; preparation of metal parts for plating, painting or enameling.

Schauer Type VA4BC-A Variable Speed Lathe

Useful in industries where large, round parts must be polished, deburred, or otherwise finished, the Schauer Type VA4BC-A Variable Speed Lathe illustrated herewith is now being produced by the Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio. The part to be finished is held on the machine spindle by means of a chuck, faceplate, or special fixture and is revolved during the finishing operation at a speed best suited to the part and the nature of the operation. Spindle speeds in a ratio of 6 to 1 from a low of 100 r.p.m. to a high of 4,800 r.p.m. are obtainable when a single-speed motor is used. This ratio is increased to 12 to 1 when a two-speed motor is used. Spindle speeds are controlled through a heavy duty Reeves variable speed drive.

To provide maximum protection to the operator, the Type VA4BC-A is equipped with a hood



"Jet Blast" Metal Cleaning and Finishing Machine

INTERNATIONAL WASHERS PROVIDE MAXIMUM PRODUCTION AND EFFICIENCY

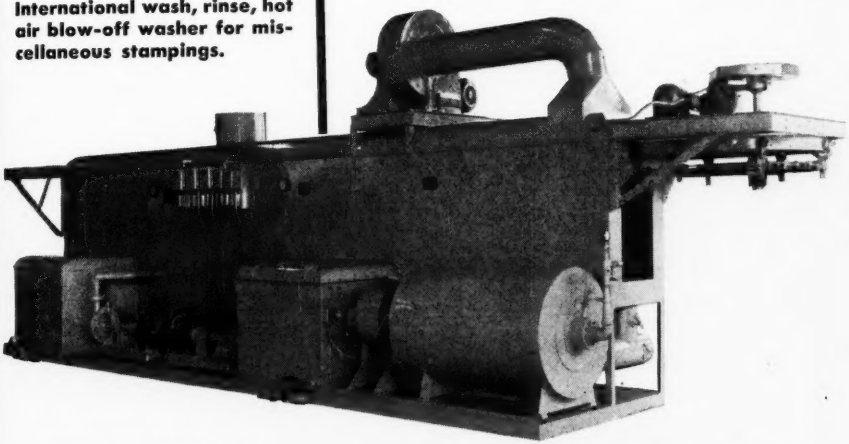
Washers and units for cleaning and preparing metal surfaces built for every type of business.

● Make International your headquarters for all types of industrial washers. Long experience in designing and building equipment for scores of industries provides the "know how" to solve your problems dependably and quickly.

Illustrated above is an International wash, rinse, hot air blow-off washer built for cleaning miscellaneous stampings. Washer is all gas fired and embodies a monorail conveyor loop complete with drive.

For improved product, high production and economical operation, call on International for your industrial washing machine and metal surface preparation equipment requirements.

International wash, rinse, hot air blow-off washer for miscellaneous stampings.



Write for folder. Recommendations and quotations promptly supplied.

INTERNATIONAL CONVEYOR & WASHER CORP.

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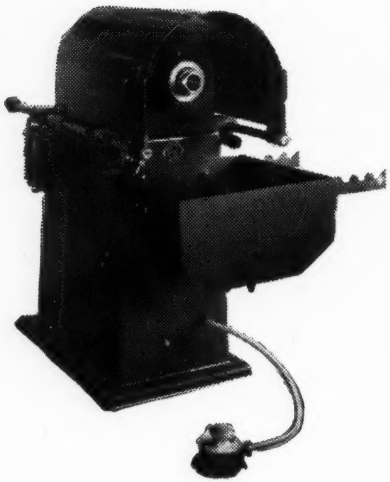


Schauer Type VA4BC-A Variable Speed Lathe

which must be drawn forward over the work before the machine can be started. Control is provided by an electrically operated solenoid valve actuated by a limit switch which, in turn, is operated by movement of the guard hood. With the hood back and the work uncovered, the foot switch which controls the starting and stopping of the machine spindle is disengaged. When the hood is drawn forward and the workpiece is covered, the electric circuit through the switch is energized, and pressure on the switch provides for starting of the spindle rotation.

With the above described arrangement, the spindle can be started and stopped at will so long as the hood is in the forward position. Thus, the operator may stop the machine and examine the work when necessary. With the guard back, accidental contact with the foot switch cannot start the spindle, thereby assuring safety to the operator during the loading and unloading operations. A drip pan, fitted with a rack for holding the polishing rods, is included as standard equipment of the machine.

Air-Flo Compressor

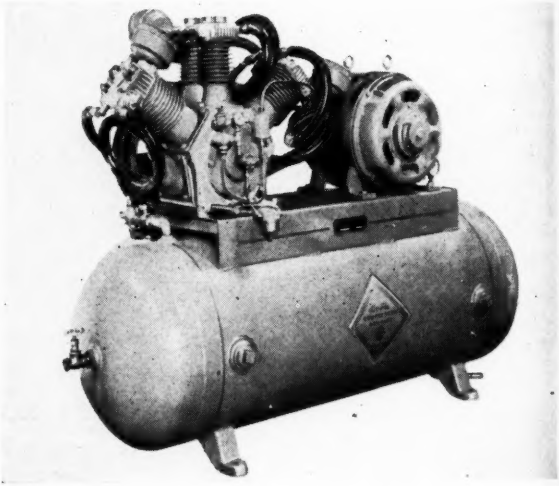
An air compressor that can "grow" to meet expanding requirements for air has been announced by the Air-Flo Compressor Co., Akron, Ohio.

The new basic compressor, on which patent applications are pending, uses 18 principal parts to construct a line of 48 different models of 1, 2, 3, 4, or 6 cylinder pumps in single or two-stage types. All parts are interchangeable from the smallest to the largest pump.

It is quite practical, for example, to purchase the size pump suitable for immediate needs and as requirements for air expand to buy additional parts to increase the compressor's capacity (or pressure).

Complete interchangeability permits carrying a small basic inventory of replacement parts for any Air-Flo Compressor in the plant, regardless of size or model.

Air-Flo Compressors are available for prompt shipment in sizes from ½ to 40 h.p. with 2.5 to 275 c.f.m. capacity at 30 to 300 lb. pressure in vertical, V-type, or side angle construction, with single, twin, or radial staggered cylinder arrangements.



Air-Flo Compressor

When it comes to specifying a rust-resisting or friction-reducing chemical finish for a production run of steel parts, whatever they may be, there are many advantages to selecting Du-Lite, particularly if you want to avoid trouble and keep production up to schedule.

Du-Lite produces on all steel and steel alloy parts except stainless a handsome, uniform jet black finish. Not a coating, Du-Lite becomes an integral part of the steel surface itself and will not chip, peel, crack or blister.

Imposed at non-critical temperature, Du-Lite causes no dimensional change in the parts treated. The process is simple to operate and inexpensive to install.

To guarantee the success of every Du-Lite installation there is available a trained, technical representative in your area who will get you started and find the "workable" answers to every problem that arises.

DO IT RIGHT WITH DU-LITE

While matching or excelling in every respect any other process for the chemical blacking of steel, Du-Lite remains less costly to operate than most. Do it right with Du-Lite. . . . . write or phone today.

WRITE or PHONE TODAY to

The DU-LITE CHEMICAL CORP.

100 RIVER ROAD -:- MIDDLETOWN, CONN.

Armour Abrasive Belt

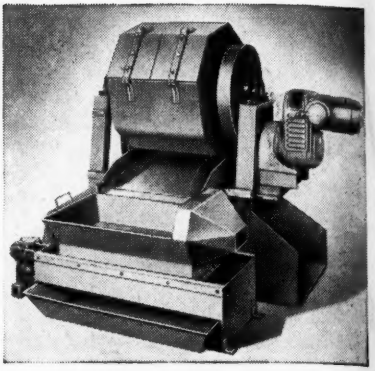
An abrasive belt for use in backstand polishing and grinding is available from Armour & Co., 1355 W. 31st St., Chicago 9, Illinois.

The manufacturer points out that the belt is designed so that the sharp cutting points of the abrasive provide rapid, clean cutting action. Other advantages of the Armour Abrasive Belt are said to include cool cutting and maximum cutting efficiency.

Belke Combination Deburring Barrel and Separator

The Belke Combination Deburring Barrel and Separator, developed by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill., is said to remove burrs from machined parts without affecting close tolerances.

The barrel has two compartments, permitting two completely independent jobs to be run simultaneously. One, three, or four-compartment barrels are also available. The barrel is rotated by an enclosed variable speed drive.



Belke Combination Deburring Barrel and Separator

As the barrel is emptied, the load slides down the chute into the motor-driven separator which separates the work and media. The hopper, which tilts for convenient emptying, and the removable drawer below accommodate the separated media and work.

FASTER REFINISHING WITH *ELECTRO* COLD STRIPPER

▸ No more long waits while slow-acting paint removers do their work like a team of lumbering oxen. Simply dip the article into Electro Cold Stripper and—Presto!—you can see the old finish literally "pop off" before your eyes. Wash with a pressure stream of water or wipe well with rag and REFINISH IMMEDIATELY. No fuss, no waiting, no bother.

▸ Used cold. Non-inflammable. Non-injurious to hands or metal when used as directed.

▸ Removes paints, enamels, synthetics, lacquers and wrinkles in minutes—not hours. Especially effective on hard-to-remove baked-type finishes. Will not harm even precision finished aluminum, copper, brass, magnesium, zinc, steel, cast iron or their alloys in time required for removal of paint film.

Write for sample and quotations—or order 5 gallons at drum price.

ALLIED FINISHING SPECIALTIES CO.

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Every Man Doing METAL FINISHING Should Have This FREE BULLETIN

TELLS HOW TO CUT METAL FINISHING COST with MINIT KOTE

• No matter what cleaning system you are now using, it will pay you to "get the facts" about MINIT-KOTE—the *one-stage washer* cleaning system that is cutting metal finishing costs, to the rock bottom, for many of the nation's largest manufacturers of quality metal products.

MINIT-KOTE removes the risk from metal finishing. It provides faster, more thorough cleaning and at the same time protects by forming a light, but uniform phosphate coating on the cleaned surface for better, longer lasting paint adherence —all in one simple, cost cutting operation.

Every man doing metal finishing should know the MINIT-KOTE *cost cutting story*. Bulletin gives all the information—it's yours, free for the asking.

GET THE FACTS . . . WRITE FOR BULLETIN TODAY.

KLEM *Chemicals Inc.*

OFFICES IN PRINCIPAL CITIES

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988 Shop Coat Primer

A new synthetic primer, designated as 988 Shop Coat Primer, has been announced by V. J. Dolan & Co., Inc., 1830 N. Laramie Ave., Chicago 39, Illinois.

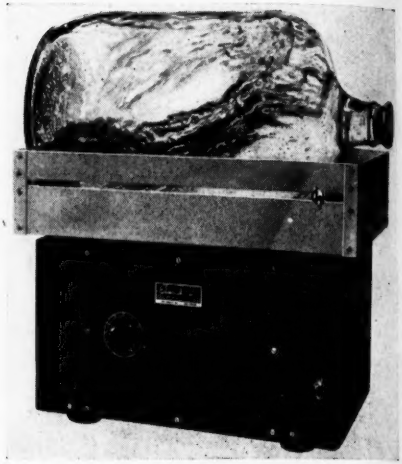
According to the manufacturer, this synthetic can be handled with a five to six-minute flash air dry, or can be baked 20 to 30 minutes at 300 deg. F. The color is pleasing and excellent adhesion to all metals is claimed.

The manufacturer states that the primer is compatible with succeeding coats of lacquer or synthetics and possesses excellent hiding qualities.

Eberbach Laboratory Shaker

A sturdily constructed, variable speed laboratory shaker has been announced by Eberbach & Son Co., Ann Arbor, Mich. Through the use of various types of carriers, the unit can be utilized to shake liquids in a variety of containers.

Models are available with four different power units having various speed characteristics. There are three basic designs of carrier. Items varying in size from a small laboratory flask to a large 5-gallon bottle can be agitated through the use of this device.



Eberbach Laboratory Shaker

"Dry" Plating Process

A process of metal plating by means of a gaseous medium has been developed by The Commonwealth Engineering Co., Dayton, Ohio. Heat is the sole means of deposition in the Commowealth gas plating process, which involves the thermal decomposition of metal carbonyls in an inert atmosphere of carbon dioxide.

Objects to be plated are radiant-heated in a plating chamber supplied by a metal carbonyl generator, in a closed system which recycles the plating gases for economy of operation. It is stated that an integral metal coating is quickly obtained at temperatures of approximately 400 deg F., and the "dry"' process is applicable to any material which will withstand this temperature range.

Rate of uniform deposition is said to be excellent, and irregular surfaces, complex shapes, and articles with internal areas can be readily processed. The process is ideally suited to the continuous plating of strip moving at fairly high speeds. Carbonyls of a number of metals, including nickel, iron, chromium, tungsten, and molybdenum, may be used in the process. Surface preparation for gas plating is the same as for electrolytic plating.

CUT DOWN REJECTS
WITH
ORVUS
IN YOUR METAL CLEANING BATHS

You'll find this synthetic detergent effective
—as a wetting agent
—as an emulsifier
—in dispersing lime soaps which might cause poor plating if allowed to deposit on the metal
—in speeding rinsing — minimizing water marks

Write for further information about Orvus to

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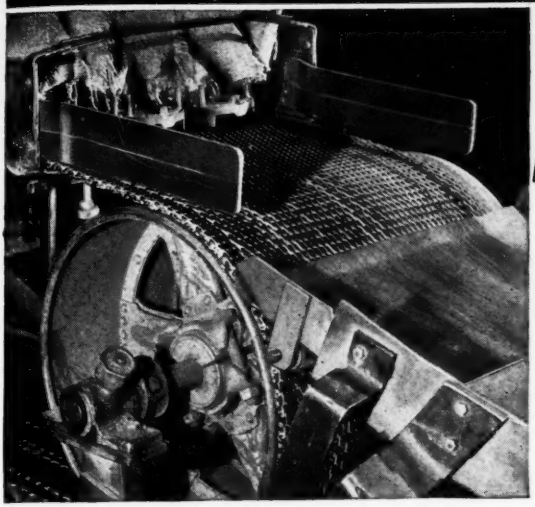
HOW *Cambridge* WOVEN WIRE CONVEYOR BELTS



REDUCE Handling-- Maintenance

BOOST Production Rates

This Cambridge Rod Reinforced Belt continuously copper-brazes metal parts at 2050°F. Metal discharge chute is equipped with roller to protect the belt from damage.

The moving belt permits *continuous* treatment or movement without time-wasting stops at machine stations . . . replaces costly manual labor for handling materials. In most cases one loader is adequate to feed the belt.

And maintenance costs fade because Cambridge woven wire conveyor belts are specially engineered from the particular metal or alloy . . . to the particular mesh or weave . . . that best suits your individual case.

FREE BOOK! "Woven Wire Conveyor Belts for Industrial Applications." 56 pages, illustrated, describing Cambridge Belt construction and use. Valuable data for all plant operating men. Write for your copy today!

Call in a Cambridge engineer today to discuss the proper belt type for your plant. There's a Cambridge Sales Engineering Office near you.

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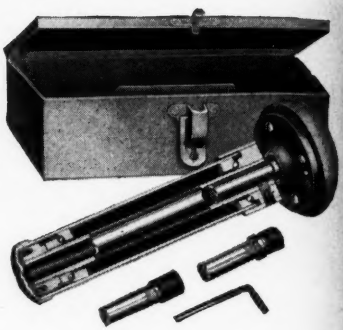
Codur Gloss White Baking Enamel 68080

A new baking enamel has been developed by Maas & Waldstein Co., Newark, N. J., manufacturer of industrial finishes, for use on the reflector panels of light fixtures.

Known as Codur Gloss White Baking Enamel 68080, the material exceeds the minimum reflectivity tests as established by the Certified Lamp Manufacturers in having 87 per cent reflectivity, the manufacturer states. In addition, this material withstands 1,000 hours humidity test and shows no breakdown when subjected to 500 hours salt spray test. These properties make the enamel an excellent finish for flourescent light reflector panels, it is claimed.

Work Holding Spinner

Product of the Trailer Lock & Body Co., Inc., 448 N. Halsted St., Chicago 22, Ill., a work holding spinner has been designed with a hollow shaft which makes possible the use of various adapters and collets.



Work Holding Spinner

The spinner, said to be sturdily built and mounted in ball bearings, is 1½ inches in diameter and available in lengths of 7½ or 10 inches. A work holding fixture flange with a permanent shank can be fitted to the spinner. The spinner and flange may be obtained together with a metal box large enough to hold other small adapters which might be needed for various polishing operations.

GOLD PLATING SOLUTIONS

In All Colors

Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant

Proven Quality by the Acid Test

Write or call our experts about your plating problems

Davis-K-Products Co.

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Oregon 4-4108
4-4109

Brass Cleaning Process

A new process for cleaning brass, and for cleaning copper and copper alloys such as nickel silver and Monel metal prior to electroplating is a recent development of the chemical research laboratories of Oakite Products, Inc., 120 Thames St., New York 6, New York.

The method embraces the use of combined solutions of two new materials, Oakite Composition No. 91 and Oakite Composition No. 91-A, a combination

WOOD TANKS for
Plating and Pickling

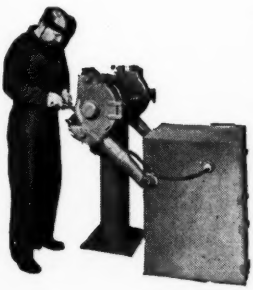
Excellent Service on all types of wood tanks for any purpose. Built to your specifications by one of America's oldest tank specialists.

Ask for estimates and suggestions.

KALAMAZOO TANK & SILO CO. • Kalamazoo 16, Mich.

"coast" through the day's work in this machine shop.

Many different jobs, some of unusual shape, made dust collecting a problem on this cutter-grinder. It was solved with a mobile *Torit* Dust Collector mounted on casters, and flexible suction tube assembly, permitting adjustment in any position.



Torit Dust Collectors are designed to meet standard and special dust collecting problems. Compact and self-contained, they fit all production layouts. They are available for immediate delivery in sizes up to 5 H. P. For complete details and the latest Torit catalog, write

TORIT MANUFACTURING CO.

314 Walnut Street St. Paul 2, Minn.

which has demonstrated in extensive tests its ability to remove readily buffing compounds, cutting oils, forming oils, and shop dirt contaminations. The first of these materials is a specialized cleaner, while the second is an additive which, when used with the former, helps prevent the formation of tarnish on brass parts and gives the resulting solution excellent chromic acid tolerance, the manufacturer states. In both the basic cleaner, Oakite Composition No. 91, and in the additive, Oakite Composition No. 91-A, there is incorporated a combination of wetting agents which are not broken down by the heat of the solution or the passage of current, plus special solvents and lime-sequestering agents. A combined solution of these materials thus enjoys long life because of its resistance to decomposition from heat or electricity. In addition, these two-material solutions have high conductivity, remain free from surface scum, and perform well with hard water, it is claimed.

The manufacturer reports that combined solutions of these materials perform effectively in any of the established precleaning sequences of the plating industry, including: (1) direct-reverse current cleaning; (2) soak tank method followed by reverse current; (3) anodic cleaning where only one cleaning tank is available; and (4) cathodic cleaning.

STOP

INTER-DEPARTMENTAL

RUST

In soluble oil solutions . . . grinding solutions . . . wash and rinse tanks . . . those points in your production cycle where rust actually starts . . . we recommend Rustex No. 2. Sample or further facts sent upon request.

Stuart INDUSTRIAL SERVICE, INC.

166 W. Jackson Blvd. Chicago 4

Jernstedt Plater's Computer

Jernstedt Plater's Computer

A new Jernstedt Plater's Computer, the simplified and improved 1948 model, is available from the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

The Jernstedt Computer does for the plater what a slide rule does for the engineer. In a few seconds, the user can calculate (1) plating time required to deposit a given thickness of any metal; (2) current density required to produce a deposit of given thickness; (3) thickness of deposit resulting from an established plating time at a known current density.

Hilo No. 2463 Alkali-Resisting White Enamel

Introduced by Hilo Varnish Corp., 42 Stewart Ave., Brooklyn 6, N. Y., Hilo No. 2463 White Enamel is said to withstand 100 hours in standard test detergent soap solution at 160-165 deg. F. without showing film breakdown or loss of gloss.

The manufacturer states that the enamel is ideally suited for use on washing machines, kitchen equipment, bathroom fixtures and accessories, and many other products subject to contact with soap and detergents used in washing. It may be used on both metal and wood. After application, it should be baked at 300 deg. F. for 30 minutes or 250 deg. F. for one hour.

ROLOCK

HEAT AND CORROSION RESISTANT

FABRICATED ALLOYS

In all Rolock fabricated alloys, careful construction combined with the latest design improvements give you long, trouble-free service life. They are built of the most suitable materials available to withstand expected shock and abrasion. Every effort is made to minimize weight yet increase load capacity . . . up to as high as 12,000 lbs.

One comparatively simple Rolock fabrication is this combination sheet and mesh bucket for easier handling of small metal parts. Bottom of bucket and pouring spout are mesh, welded to sheet steel sides . . . allowing liquid to drain from parts during handling . . . one of hundreds of designs that save time, effort and money, and give better results for Rolock customers. Send for catalog.

ROLOCK INC., 1400 Kings Highway, Fairfield, Conn.

Offices in: Philadelphia, Cleveland, Detroit, Indianapolis, Chicago, St. Louis, Los Angeles.

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

44RL48

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

Motor-Generator Bulletin G-102. A bulletin on low-voltage direct current motor-generator sets has been issued by the Hanson-Van Winkle-Munning Co., Matawan, N. J., and is designated as Bulletin G-102. The bulletin describes motor-generator sets for all low voltage applications such as electroplating, electrocleaning, anodizing, Manodizing, electropolishing, electrocoloring, electrotyping, electroforming, metals refining, and electrolytic production of chemicals.

The bulletin lists and illustrates generators ranging in size from 300 to 40,000 amperes at 6 to 40 volts. It describes in detail certain special construction features, such as brushes, brush holders and rigging, commutator risers, bearings, control panels, and so on. Included also are general specifications and efficiency curves for generators of various sizes.

An interesting set of illustrations shows the development of low voltage generators from the "Wonder" built in 1886 to the high efficiency H-VW-M motor-generator set of today.

"Easy Sailing with Superior Polishing Accessories" is the title of a four-page folder issued by the Trailer Lock & Body Co., Inc., 448 N. Halsted St., Chicago 22, Ill., illustrating and describing the work holding spinners, tapered screw points, polishing lathe collars, polishing wheel balancing mandrels, flanges, and emery troughs manufactured by the company.

Chromalox Electric Radiant Heaters is the subject of Bulletin CS-603, currently being distributed by Edwin L. Weigand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa. The four-page two-color bulletin describes the construction of Chromalox heaters and lists the uses, operating characteristics, and advantages of the infra-red units.

"You, Too, Can Reduce Costs, Improve Product, and Speed Up Production" is the title of a six-page two-color folder issued by The Fostoria Pressed Steel Corp., Fostoria, Ohio, which discusses the advantages of Fostoria Infra-Red Evenray Systems and illustrates and describes typical installations of the systems for the infra-red processing of metal and other parts and products in a wide variety of industries.

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Superior for Polishing and Buffing
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Send for our New Complete Catalog

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Phosphoric Acid Metal Conditioner

PREPARES METAL FOR PAINTING

- *CLEANS METAL—Removes oil, rust and corrosive agents.*
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In Canada made and sold by Boyle Chemicals Limited, Windsor, Ontario.

Heresite Booklet. A 30-page illustrated booklet describing Heresite phenol-formaldehyde synthetic coatings is being issued by Heresite & Chemical Co., Manitowoc, Wisconsin.

Properties of and application methods for the various Heresite products are described in detail. Products typical of those best suited for coating with the Heresite finishes are pictured in the booklet.

R. C. Mahon Company Brochure. A 36-page, two-color, attractively illustrated brochure outlining the company's facilities and activities is being issued by The R. C. Mahon Co., 8650 Mt. Elliott Ave., Detroit 11, Michigan.

The brochure is designed to describe the various Mahon products, how they are produced, and the company's capacity to serve industry. The two plants housing the seven Mahon Company divisions are pictured and discussed. Attention is devoted to methods of manufacture and installation.

A concluding statement points out that the company is in a better position to progress and serve industry than at any time during its 36 years of existence.

BOOTHCOTE

cleans spray booths quickly, economically, safely!

Spray Boothcote on clean booth. Surplus paint can then be peeled off in sheets by any operator.

- Saves time and labor
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Money back trial offer: 15 gals. $16.50 f.o.b. Buffalo or write for Circular.

Distributors! Write for open territories.

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Boothcote Div., 19 Stetson St., Buffalo 6, N. Y.

"The Coating Corner" is the title of an informative monthly bulletin currently being issued by the Industrial Research Division, Brooklyn Varnish Manufacturing Co., 50 Jay St., Brooklyn 1, N. Y. The monthly publication contains information regarding the solution of specific finishing problems in addition to other helpful and interesting information. The publication may be obtained by writing to the Industrial Research Division of the Brooklyn Varnish Manufacturing Company.

"Enthone Ebonol Coloring and Blackening Processes for Metals" is the title of an eight-page four-color booklet being issued by Enthone, Inc., 442 Elm St., New Haven 2, Connecticut.

The booklet describes in detail the procedure to be followed in blackening copper and copper alloys with Ebonol C, iron and steel with Ebonol S, and zinc and zinc alloys with Ebonol Z. Properties of each coating are discussed and uses for each process suggested.

Durcopump Bulletin 815. A new 20-page, two-color illustrated bulletin on Model 40 Series M centrifugal Durcopumps is being distributed by The Duriron Co., Inc., Dayton 1, Ohio.

Design features of the pumps are described and illustrated by exploded views of all parts. Alloys from which the wet ends of the pump may be fabricated are listed, and include: Duriron, Durichlor, Durimet 20, Durco D-10, Chlorimet 2, Monel, nickel, Inconel, Ni-resist, nickel cast iron, and cast steel.

Detailed information on pump accessories and modifications is furnished.

Houghton New Product Index. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa., has issued a new attractive product index designed to guide purchasers in the various applications of Houghton products. The six-page blue and white folder lists the products by trade name and by individual application. Such categories as lubricants, metal working, textile processing, leather, oils and greases, and hydraulic and transmission products are included.

The back cover of the new product index is devoted to a listing of Houghton's 75 world-wide offices.

You can produce on any material the following surface finishes:

FELT - SUEDE LEATHER - MOHAIR VELOUR - VELVET - CARPET

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Used in the auto, airplane, radio, electrical, phonograph, ceramics, furniture and many other industries for surfacing all sorts of materials to provide

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Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced—

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with these patented and trademarked Rayco specialties:

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*"Raymix"—a flock of rayon fibres, trademarked under U. S. No. 427949 to produce a suede effect of utmost realism on any surface.

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"Raycote"—a flock composed of uniformly cut rayon fibres to produce on any surface a pile effect such as velvet, plush, or velour. Made under U. S. Patent No. 2014947.

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"Harecote"—a flock composed of animal fibres, produces a durable carpet or rug material.

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"Stop Rust" is the title of a four-page folder issued by Stuart Industrial Service, Inc., 166 W. Jackson Blvd., Chicago 4, Ill., outlining the use of Rustex No. 2 to stop inter-departmental rust. The folder covers product uses and has a sample attached for testing purposes.

Behrlon Color Swatch Card. Standard colors of Behrlon Micro-Cut Rayon Fibers, in both the "Regular" and "Tufcote" grades, are illustrated on an attractive new color swatch card, available to flock users from Behr-Manning, Electro-Textile Division, Troy, New York.

"Fullerdisc Wheel Brushes" is the title of a six-page two-color illustrated folder being issued by The Fuller Brush Co., Industrial Division, Hartford 2, Conn. Operating characteristics of Fullerdisc brushes are described, and tables of brush specifications are presented. Illustrations suggest various applications of the brushes. Suggestions concerning the use and proper care of the Fullerdisc Wheel Brushes are offered.

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"Vienna Brand" Lime

Made from Limestone that is identical in chemical analysis and geological structure with European Imported Lime. Tests show a "lime cake" made from Allwood "Vienna Brand" Lime equals the finish made from imported lime.

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ALLWOOD LIME COMPANY

Manitowoc • Wisconsin

"Buffs, Polishing Wheels, and Buffing Compounds" is the title of a 16-page three-color descriptive catalog being issued by the J. C. Miller Co., 55 Mt. Vernon Ave., N. W., Grand Rapids 4, Mich. The brochure is a permanent reference catalog covering all types of buffs, polishing wheels and compounds. Included is a four-page reference section containing useful information and technical data on buffing compounds.

"Recommendations for Compounding, Masking, and Purging of Wet Paint Spray Booths" is the title of Process Specification No. 108, issued by The DuBois Co., Cincinnati 3, Ohio.

The specification describes the use of Klarifiant water wash compound in spray booths and the application of Strypp for booth purging. Booth masking with Clear Filmite and Pigmented Filmite, and collection of sludge are discussed. The specification is so arranged that it provides a handy guide to aid the paint foreman in controlling his operations.

Leeds & Northrup Catalog ND4A (2). A newly-revised 36-page catalog issued by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa., presents the latest developments in the company's Duration-Adjusting Type of L&N Electric Control for regulating temperature of electric furnaces and certain fuel-fired furnaces. Illustrated with numerous pictures of actual installations, this publication describes the O.A.T. method for controlling heat input by supplying electric power (or heat from combustion) in impulses of controlled duration. It shows how this system provides the full benefits of proportional control, with automatic droop correction.

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"Fiftieth Anniversary of Nickeloid Metals" is the title of a 20-page two-color brochure highlighting the founding and growth of the American Nickeloid Co., Peru, Ill. The brochure sets forth in an interesting fashion the manner in which technical developments in the manufacture of pre-plated metals paced the growth of the company.

"Ucilon" Specialized Industrial Protective Coatings are discussed in a four-page two-color illustrated folder issued by United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y. Included are data on the features, advantages, physical properties, and applications of the coatings, which are intended for the protection of metal, concrete, and wood.

Motor and Generator Brush Standardization Catalog Section B-2106. The National Carbon Co., Inc., Room 1328, 30 E. 42nd St., New York 17, N. Y., is offering a catalog on Standardization of Carbon, Graphite and Metal-Graphite Brushes for Motors and Generators, which outlines a simple method of saving time and money for all users of motors and generators by illustrating how standardization can be accomplished through the use of National Carbon Company's simplified RC Number system.

How every metal finishing shop may have pure water always available is described in a six-page, two-color folder being distributed by A. E. Tomkin & Co., P. O. Box 7311, Washington 4, D.C. Entitled **"Hydrion Water Demineralizer,"** the folder describes how the Hydrion demineralizer is used and how it removes dissolved mineral impurities from water.

"Industrial Dust Control" is the title of Bulletin No. 98 being issued by The W. W. Sly Manufacturing Co., 4700 Train Ave., Cleveland 2, Ohio.

The 24-page illustrated bulletin outlines basic principles of dust control in industrial plants. Operating principles of the Sly dust filter are discussed, and dimensions and capacities of the unit are listed. The bulletin is profusely illustrated with views of a number of typical installations in various industrial fields.

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For product finishing and preparation, there's an Edmont fabric-lined, rubber-coated glove to fit your needs. Many years of experience in industry proves they outwear ordinary gloves many times over. Check these principal features:

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Sizes available for men and women in knit wrist style or with gauntlet in a variety of lengths.

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TRADE MARK REG. U.S. PAT. OFF.

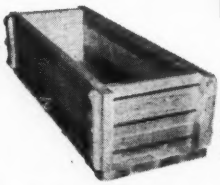
Fabric Lined
RUBBER GLOVES

Edmont Mfg. Co., 509 Orange St., Coshocton, O.

Paint-Shield Leaflet. A leaflet describing the use and advantages of Paint-Shield Liquid Masking Tape is being distributed by Ramsell Products, Inc., 712 S. 5th Ave., Maywood, Illinois.

Pneumatic Atomizing Nozzle Catalog. Illustrations and data on a wide range of types of pneumatic atomizing nozzles are presented in Catalog No. 23 being distributed by Spraying Systems Co., 4021 W. Lake St., Chicago 24, Ill. The information is so presented as to simplify selection of nozzles to meet specific requirements in terms of capacity, type, and spray characteristics. Nozzle details are illustrated by means of cutaway illustrations in the 12-page, two-color catalog.

"Karbate" Pipe and Fittings Catalog Section M-8800B. An illustrated descriptive booklet covering "Karbate" brand pipe and fittings is now available from the National Carbon Co., Inc., 60 E. 42nd St., New York 17, N. Y. The booklet contains detailed engineering information on Karbate pipe and fittings, including comprehensive tables of the chemical and physical properties of the material. All pipe sizes and fittings are illustrated and cross-section drawings show dimensions, assemblies, joining recommendations, and other details to aid design work and to facilitate ordering.



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Chromium Plating Bulletin. A bulletin describing the advantages of using "Metachrome," a bulk chromium plating process, and "Nuchrome," a new chromium plating solution formula, has been issued by Chromium Engineers, Inc., 2636 S. Michigan Ave., Chicago 16, Illinois.

Johnson Sand-Air Bulletin. The Johnson Sand-Air Model HJ-100 air-driven reciprocating type sanding machine is described in a two-page, two-color illustrated bulletin now available from H. Johnson Engineering & Sales Co., 113 Broadway, Rockford, Illinois.

Features of the portable sander which make its use advantageous for finishing curved or flat metal, plastic and wood surfaces are described in detail.

Nicholson Welded Floats of stainless steel, Monel, and steel construction in spherical, elliptical, and cylindrical shapes for pressures from vacuum to 4,800 lb. are fully illustrated and described in an eight-page two-color bulletin released by W. H. Nicholson & Co., 136 Oregon St., Wilkes-Barre, Pa. Volume and buoyancy data are included together with tables presenting list prices of the various floats.

Schmieg Catalogs. Two new catalogs, Nos. 480 and 481, are announced by Schmieg Industries, Inc., 314 Piquett Ave., Detroit 2, Mich., engineer and manufacturer of plant equipment.

Catalog 480 describes the Schmieg Centri-Merge Spray Booths for the elimination of paint overspray, with photographs and blueprint reproductions of typical plant installations.

Catalog 481 offers comprehensive information concerning equipment manufactured by Schmieg, including dust and fume control units, spray booths, mechanical washers, industrial ovens, and sheet metal equipment and accessories. Tables of technical information for plant managers and engineers are included.

For a real good polishing job use

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FRESH SUPPLY AVAILABLE

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"Air-Flo Standardized Compressors" is the title of a four-page folder which illustrates and describes the various models available from the Air-Flo Compressor Co., Akron, Ohio.

Metal Cleaning Equipment Bulletin. American Machine & Solvents Co., 101 Park Ave., New York 17, N. Y., is distributing a four-page bulletin describing metal cleaning equipment suitable for tumbling stampings, screw machine parts and similar products through a washing, rinsing and drying cycle.

"What Is Vertical Sweep?" is the title of a four-page folder now being distributed by the Farrington Pickwick Co., Phoenixville, Pa., which illustrates and describes the company's paint agitators. Pictured and described are two models of agitators, the Fastmix for single trip drums, and the Sturdimix for 30 and 55-gallon ICC drums. On the last page of the folder four features of both models are illustrated and their advantages discussed.

"Vinylite Resins and Plastics" is the title of a 38-page attractively illustrated four-color booklet issued by the Bakelite Corp., 30 E. 42nd St., New York 17, N. Y. Types of resins furnished by the Bakelite Corporation are listed together with a partial list of uses in which the resins find application. Uses of the various resins for surface coatings of various kinds are listed and tables of properties of the resins are included.

"Brown ElectroniK Potentiometers" is the title of Catalog No. 15-13 issued by the Brown Instrument Co., Wayne & Roberts Aves., Philadelphia 44, Pa. The 32-page catalog contains many schematic diagrams, photographs, and dimensional drawings used to illustrate the constructional features and operating principles of the instruments presented.

Among the instruments and systems included in the catalog are the ElectroniK strip chart electric control potentiometers, strip chart and circular chart recorders, precision indicators, strip chart and circular chart controllers, indicating controllers, pyrometric switches, thermocouple and radiamatic assemblies, and the "continuous balance" principle.

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wear a DUPOR No. 4
The ideal twin filter respirator to keep sawdust, silica dust, grinding compounds out of nose—throat—lungs! A favorite protection for paint spray, fumes, gases, vapors, etc. Rubber face mask provides airtight fit, controlled breathing, panorama view, no blind spots.
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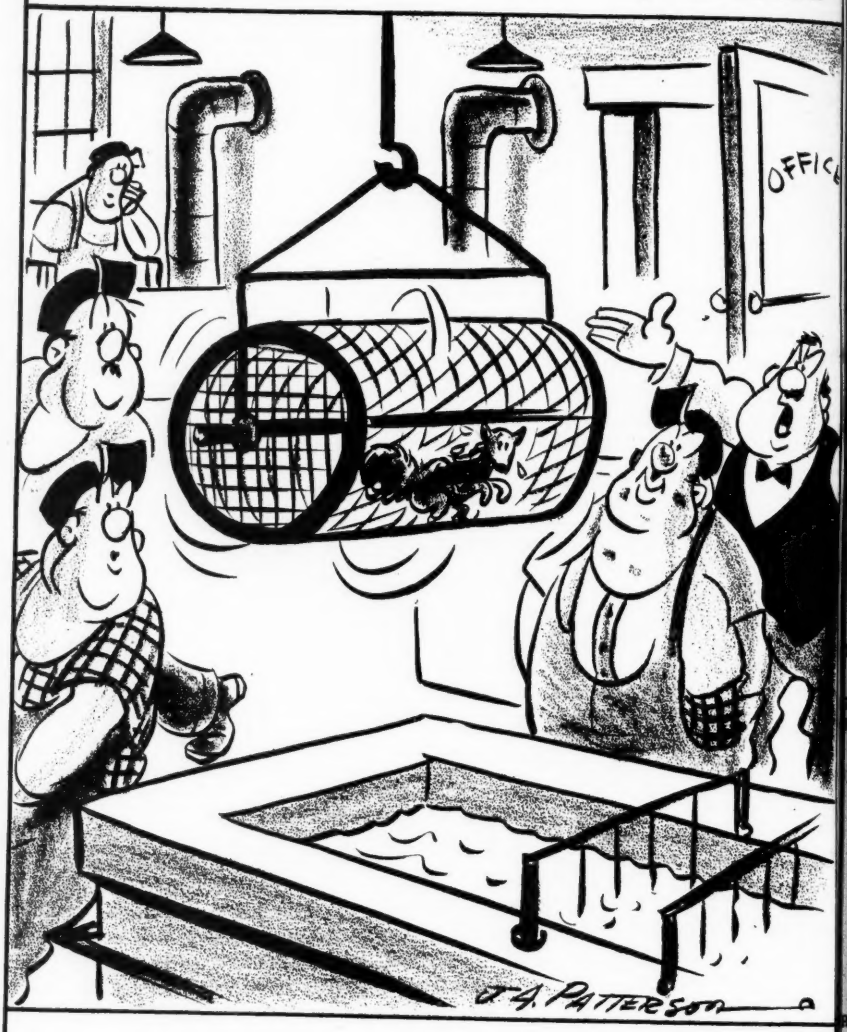

"I said turn that squirrel loose and get back to your pickling job!"